The Mining Journal

Established 1835 — Railway & Commercial Gazette

Vol. CCXLV No. 6264 — LONDON, SEPTEMBER 9, 1955 — PRICE 8d.

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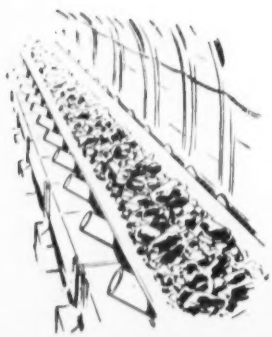

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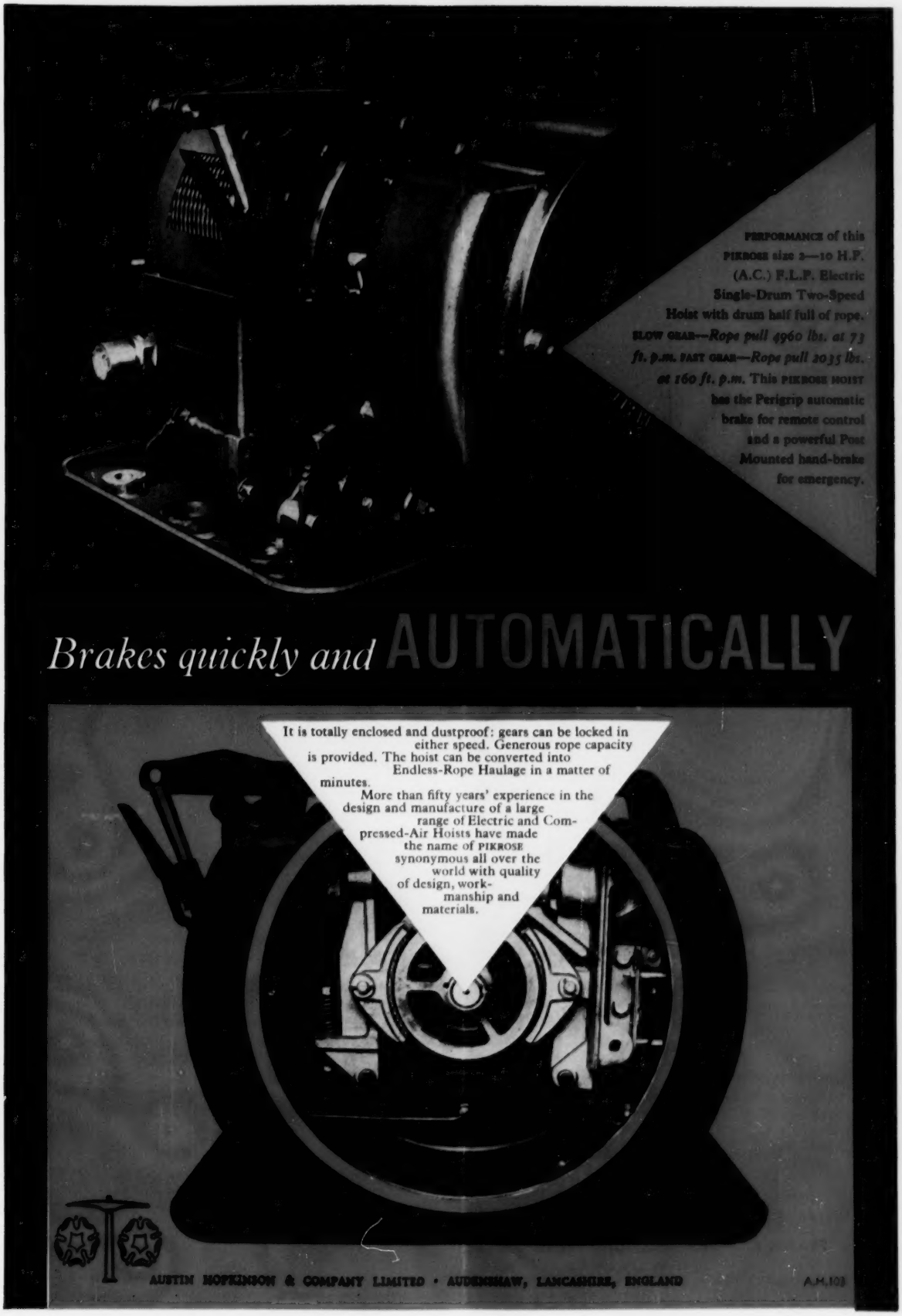
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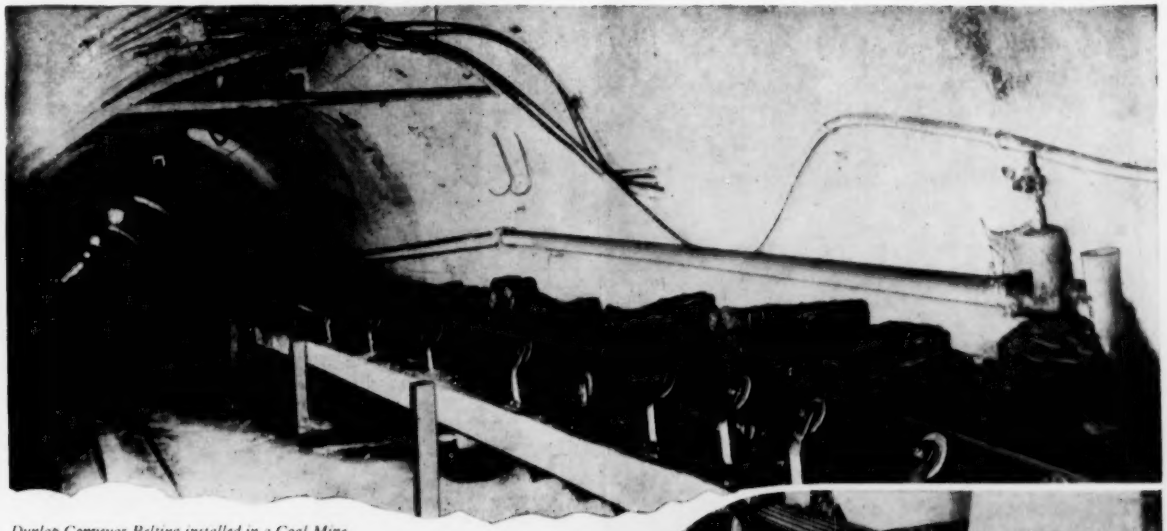

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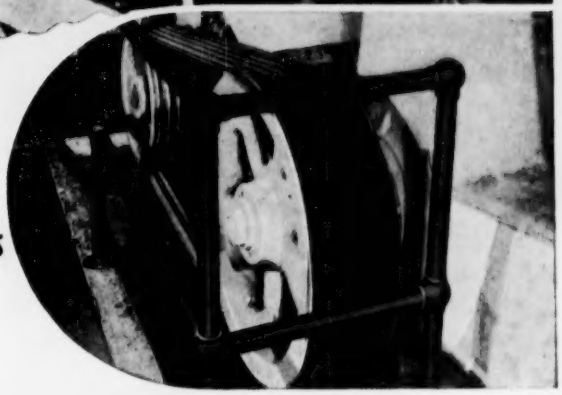
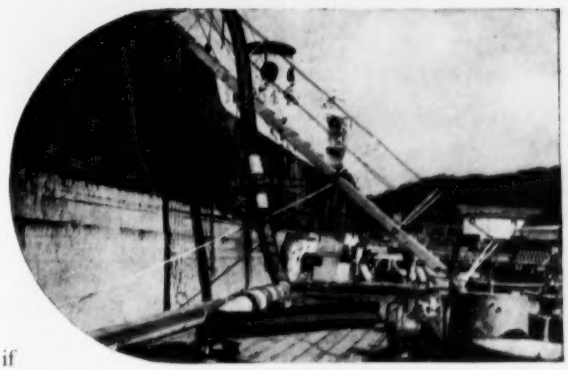


A Dunlop Compressor Drive in operation in an engine room.



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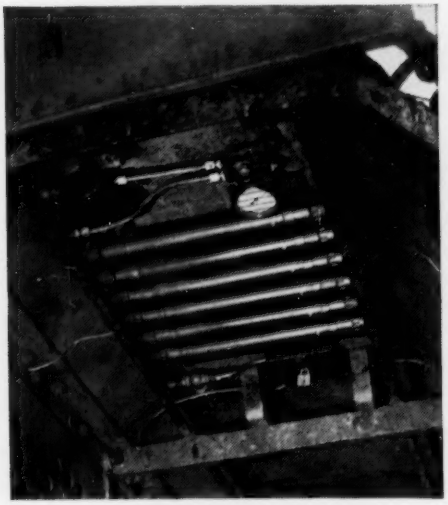

Tecalemit Lubricator under the roof of a cage at Walsall Colliery, Staffs, shown with the cover removed.

Tecalemit Lubricator protecting Guide Ropes at Calverton Colliery, Notts.

Tecalemit Lubricators as installed at Littleton Colliery, Staffs.

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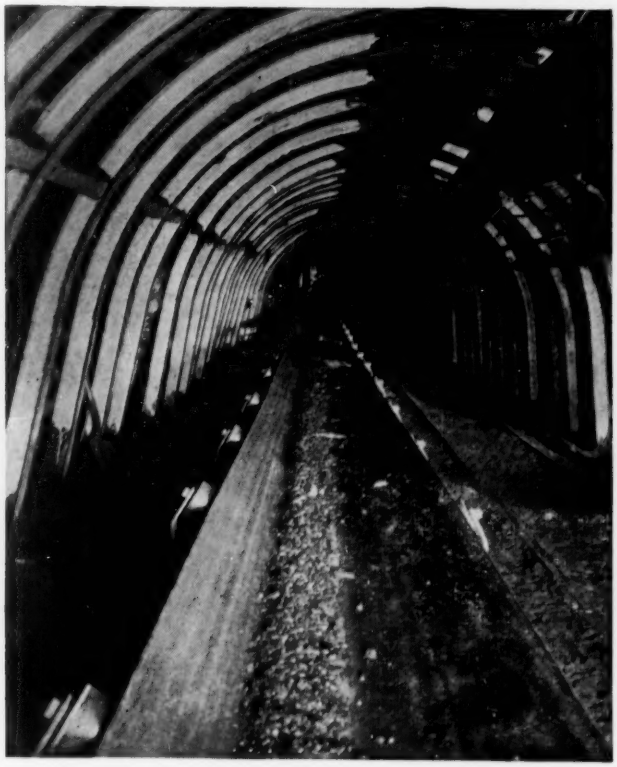

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(The illustration shows "Fenaplast" conveyor belting made by J. H. Fenner & Co. Ltd.)

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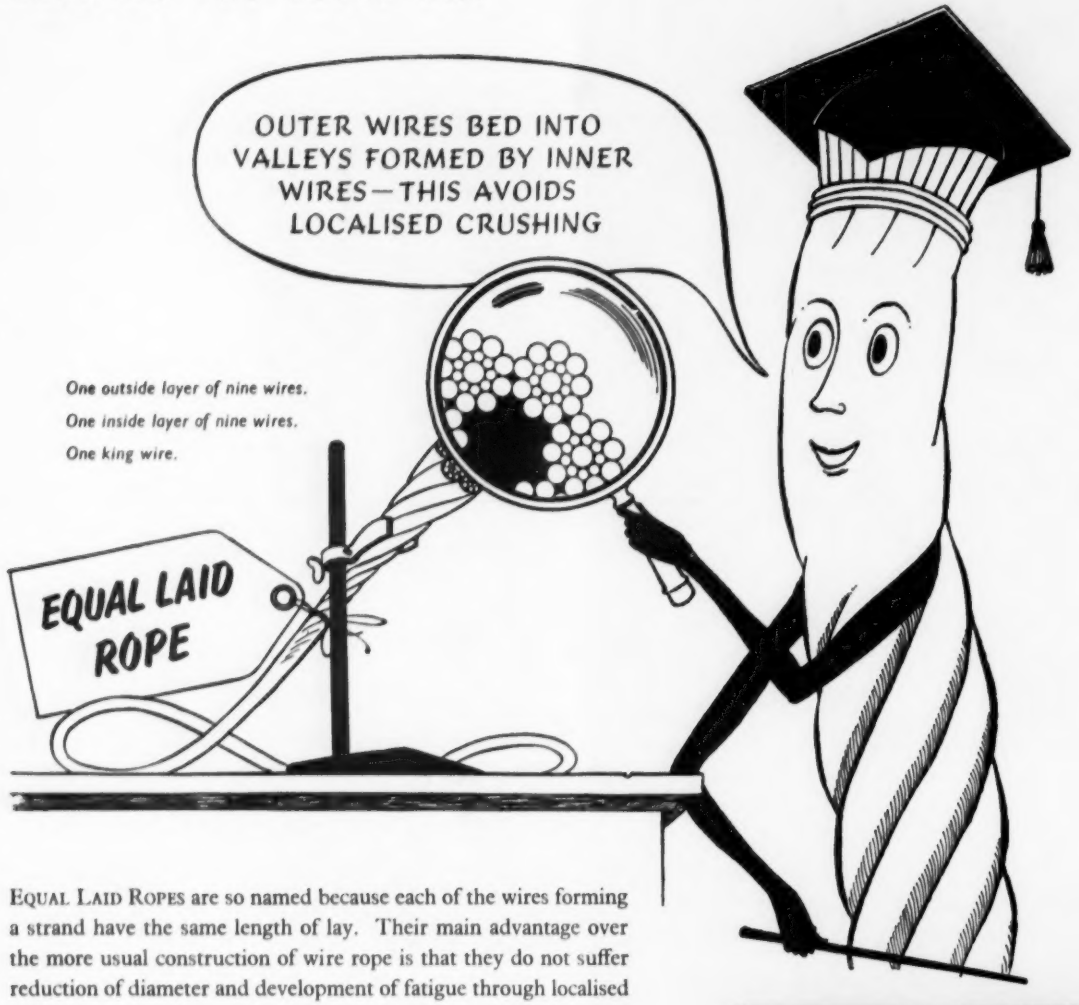
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Established 1835

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NOTES AND COMMENTS

The I.M.F. and the Gold Price

The annual meeting of the International Monetary Fund which opens next week in Istanbul will be of more than ordinary interest to the United Kingdom for three reasons. It will become apparent, too, as these reasons are outlined, that the meeting may mark a stage in Mr. Butler's political career, which has appeared slightly less assured in the last week or two.

In the first place, Mr. Butler will be expected to make some comment on the state of the British economy; indeed, he will not be able to avoid it. It is not merely that the British economy—as the July gold figures showed—has not yet been pulled under control. Britain was one of the leaders in a worldwide tightening of credit which, if it were carried too far, could threaten trade and particularly the demand for raw materials and minerals. The problem of bringing national economies under control while not strangling trade will almost certainly be a feature of the conference.

The second reason why Istanbul may be important depends on whether Mr. Butler seizes the opportunity that will be presented to him. When the E.P.U. agreement was renewed in its new form, rules were written into it to govern the circumstances which would arise should members decide to make their currencies convertible. These rules included a monthly settlement of acounts and an obligation to state in advance the rate, or the limits of a flexible rate, at which the next month's settlements would be made. (No limits were set on the degree of flexibility but rates could obviously not vary widely without upsetting the mechanism or creating intolerably speculative positions before each declaration.) It was the insistence of the United Kingdom on this provision for flexibility and a misunderstanding—though a perfectly genuine one—of its scope and purpose that led to heavy continental speculation against sterling and a serious loss of gold in holding the transferable rate. Mr. Butler has denied that he was responsible; but responsibility scarcely matters. What does matter is that the speculation took place, the Exchange Equalization Account paid out gold to stop it, and the reserves figure bears partial witness to the consequences.

Now if E.P.U. sets no limits to currency flexibility, I.M.F. does and, at the moment, it stands at 1 per cent either side of par. The I.M.F. platform would therefore be an excellent place for Mr. Butler to announce his intentions and, if he wants permission to vary more than 1 per cent, to ask for it. If he does not, he can plainly say so. No time for making clear how he envisages sterling might go convertible could be more auspicious, for sterling is to-day plainly too weak to face convertibility and not so weak that a dash for freedom is its only hope. In other words, an announcement now would not provoke speculation, and such opportunities are too rare to be missed.

Thirdly, Mr. Louw will raise, once more, South Africa's demand for a higher price of gold. He announced his intention of doing so after visiting London and created the impression—which he subsequently denied—that South Africa could bring pressure to bear to force a higher price. Nor is it easy to see what pressure could be brought. By the rules of the I.M.F. there is no conceivable combination of votes which could effect a higher gold price that does not include the United States; but the United States, so far, has resolutely refused to pay more for gold. It has been suggested that another way lies open. If South Africa could persuade a sufficient number of countries individually to raise their buying price of gold then the effect would be to revalue the American dollar. If the price were raised to a point at which the dollar was seriously overvalued the Americans would have no option but to raise their price for gold to preserve their export trade. The trouble with this solution is that South Africa is as little likely to propose it as other countries

would be to respond to it. The only pressure that South Africa seems able to bring is to discriminate against American imports; but the United States would not be forced to yield by the loss of the South African market while South Africa would deny to herself the privilege of buying in the cheapest market.

It seems sense to argue that if the Americans were not moved by Mr. Havenga's brilliant plea for dearer gold they will not be moved by Mr. Louw. For two things have happened since Mr. Havenga made his case. The first is that the old South African mines are now that much older. Whereas Mr. Havenga, at least in part, was pleading for the restoration of international economic discipline it is only too obvious that Mr. Louw will be pleading for the life of his country's mines. The second thing that has happened is that Russia has started to sell gold in West Europe. It was always an argument of the Americans that Russia would be one of the chief beneficiaries of a higher gold price but because, when Mr. Havanga pleaded, Russia was holding fast to her gold the argument was difficult to weigh. Now that Russia is a seller it will be hard to persuade America to raise the Russian purchasing power. There must surely come a higher price for gold—but it is not likely to be agreed at the I.M.F. next week.

Relationship Between Taxation and Mining in Australia

The relationship between taxation and mining has been a pertinent one for the mining industry in Australia for a considerable time.

One aspect of this relationship has been the sale of mining properties and the taxation of the proceeds in the hands of the vendor. This position was met to some extent by the exemption of certain minerals from tax, and the exempted list has been increased recently. Briefly, the exemption applied to income derived by a *bona fide* prospector from the sale, transfer or assignment by him of his rights to mine in a particular area for gold or any other mineral or metal prescribed by regulation. An amendment has now been made by which vendor companies are regarded as *bona fide* prospectors in respect to such sales.

The initial mineral exemptions were very limited in number, but a wide extension has recently been made, and the complete list of minerals exempted under this section of the Act is : asbestos, bauxite, chromite, emery, fluorspar, graphite, ilmenite, kyanite, magnesite, manganese oxides, mica, monazite, pyrite, quartz crystals (piezo-electric quality), radio-active ores, rutile, sillimanite, vermiculite, zircon. Ores of antimony, arsenic, beryllium bismuth, cobalt, columbium, copper, lithium, mercury, molybdenum, nickel, osmiridium, platinum, selenium, strontium, tantalum, tellurium, tin, tungsten, and vanadium.

While income derived from the sale of leases containing these minerals is exempt from taxation in the hands of shareholders, dividends derived from profits arising from the mining and sale of these minerals are exempt from income tax, when in the hands of shareholders, to the extent of 20 per cent of the amount so received. Income from gold alone is entirely exempt from taxation, when in shareholders' hands as dividends.

A representation was recently made to the Australian government for total exemption from income tax on profits from the mining of pyrite. Originally, the exemption of 20 per cent was not extended to this mineral, but it has since been included in the 20 per cent provision, because of its importance to the industrial life of the country. The application for total exemption was refused, but the matter may be re-opened at a later date.

Taxation of income of mining companies calls for review. Dividends are taxed as income, but the industry feels that until the amount of capital subscribed by the shareholder has been returned, dividend distributions should be regarded as return of capital, for in many cases a mine may be closed down and abandoned when dividends paid, and taxed, represent a part only and often a very small part, of the capital put into the venture.

Down We Go

This title, borrowed from a television parlour game programme, aptly describes the state of the Brjtish coal mining industry. Unfortunately, the similarity soon ends, for in the game the competitors bob up smiling for the next round but an industrial decline precludes any such speedy recovery. Despite the current industrial boom all is not as it should be and, as has been tragically illustrated in the past, slight gaps in a nation's economic structure can with rapidity widen into gaping fissures.

Not all the blame for this dark cloud on the industrial horizon can be attributed to the miner but his is a large part of the responsibility. Despite the immense sums of money spent on improving his working and social conditions and his elevation to that of the highest paid industrial worker the bald fact remains that the shafts are not hoisting the tonnage of coal for which Britain's collieries are manned and equipped. Both from within and without the industry there is a plethora of ideas as to the best course to adopt but the difficulty is to convert theory into practice.

No amount of pious platitudes are going to awaken the miners to a sense of their responsibilities to the country and what is needed is more resolute action by the management at colliery level.

Prior to nationalization the colliery manager managed the colliery. Now his position seems to be that of a whipping boy—a legitimate target for verbal blows from the serried ranks of officials above him and vituperation from the workers below him : truly a most unenviable position. In all fairness it must be said that the inability of the Coal Board to produce more coal is not the fault only of the workers and if more resolute action is to be taken it must be directed at all levels. Ineffective officials must be removed—and not by *promotion* to a less conspicuous niche.

Perhaps foreshadowing this "get tough" policy the South-West Divisional Coal Board have closed Brynhenllys colliery in South Wales. Although closure threats have been given to a dozen or so collieries throughout the U.K. this is only the second pit to be closed because of restrictive practices. Usually the bare threat is sufficient to imbue the men with enthusiasm and in one instance output rose by 800 per cent on some shifts—inglorious testimony to the effectiveness of the big stick. At Brynhenllys, however, the output per man shift had reached the appalling figure of 2¼ cwt. overall and despite strenuous efforts by the area general manager indiscipline and restriction continued, culminating in the eventual closure of the colliery. Whilst this closure will result in a localized weekly loss of a few hundred tons of much needed anthracite, the psychological effect may be beneficial over a far wider area.

Although statistics show that the actual number of manshifts lost because of strikes is lower than before nationalization this statistical detail is not the yardstick by which morale is measured. This is at its lowest ebb and unless the British miner wakes up to reality he is going to precipitate an economic crisis with himself as the principal sufferer.

Western United States

(From Our Own Correspondent)

Portland, Oregon, September 1.

Another attempt is being made to beneficiate the beach sands which occur in large quantities for 100 miles along an ancient beach in the south-west corner of Oregon and which show Cr_2O_3 contents up to 20 per cent. These sands have attracted a great deal of attention and much effort and money have been spent in attempts to make a commercial product of the chromite. These efforts have been unsuccessful, not so much through failure to secure a satisfactory Cr_2O_3 content as to reduce the iron content so as to secure the required chromium-iron ratio. Recent extensive research and pilot plant work indicate that the problem may be solved by removing the iron as ferrous sulphate by acid leaching. The sands also carry gold and platinum which may eventually be recovered.

Minerals Engineering Co., which operates a tungsten mine and mill at Glen, Montana, and a refinery at Salt Lake City, has increased its mill capacity to 800 tpd. Exploration adjacent to its open pit orebody is encouraging and if present indications are borne out mill capacity will be increased further to 1,000 tpd.

URANIUM EXPLOITATION

Uranium news, still mostly from the Colorado Plateau, has very much of a sameness; reports of fabulous strikes, new treatment plants and company consolidations involving millions of dollars.

While it is not always easy to separate the wheat from the chaff there is no doubt that things are still moving in a big way. Atlas Corporation's Hidden Splendour has optioned Almar Minerals which brings with it other subsidiary companies in the proven part of the Big Indian district. Additional ore deposits acquired in the transaction are undoubtedly of great value but, of course, the figure of $50,000,000 given in some estimates must be regarded as highly speculative, although not beyond the realm of possibility. Numerous other consolidations and stock deals are in the current news.

Naturally the feverish activity in uranium in the past several years has been accompanied by much stock promotion and the incorporation of many companies, some of them of doubtful value or integrity. This has given authorities and legitimate brokers some concern and the situation is being closely watched. Securities Exchange Commission has had special investigators checking on new issues, particularly in Utah and Colorado, state securities departments have been tightening up and national associations of dealers in securities are watching the situation very closely, all with the purpose of protecting the public against unscrupulous stock activities.

The first uranium mill on the Pacific Coast is being completed near Mojave, California. It is a 50 ton pilot plant to treat the ores of the Verdi mine in the Rosamond district, an old gold mine that has taken a new lease on life as a uranium producer. A sulphuric acid leach will be used and with the process developed satisfactorily will be increased to 250 tpd. and custom ore treated.

So far Oregon has been a uranium orphan but discoveries made in July in Lake County in the South Central part of the State indicate what may become a field of some importance. Little information is being given out pending development but discoveries averaging 0.7 per cent U_3O_8 with highs up to 1.37 per cent have been found over a considerable area. Systematic surface exploration and core drilling are being carried on.

Canada

(From Our Own Correspondent)

Blind River, August 26.

Scientific information revealed at the recent Geneva Conference came in such abundance and delved so far into future possibilities as to concoct a brew which proved difficult for the digestion of the general public. A confused public appears to have gained the impression that because the uranium resources throughout the world occur in abundance, the element will become cheap—whereas the truth is that in order to mine uranium in the "abundance" referred to, the consumer would probably have to pay two or three times the price now prevailing.

Meanwhile, the operators of uranium mines in Canada are optimistic. With the present price of uranium guaranteed by the Canadian government until 1962, the outlook is that because of the feverish rate of research throughout the world, the strides made in the utilization of atomic energy may reasonably pave the way to an extension of the period of guaranteed price, and at possibly a higher price for uranium than that now prevailing. When mining ore which contains 0.10 per cent or more uranium a price of $10 per lb. for uranium oxide is profitable. However, there is no evidence of any great abundance of mining fields such as Blind River with ore of such grade—these being the cream, so to speak. With the cream removed, and under the necessity of having to turn to lower grade areas and to deal with ore containing possibly .02 or .03 per cent a price ranging up to $30 per lb. would have to be paid in order to gain profitable access to the "abundance" referred to by scientists. While scientists may correctly peer generations—or even centuries ahead—it remains for practical operators as well as investors to deal with the present.

OTHER DEVELOPMENTS

Iron ore is flowing in increasing volume from the iron ranges of Quebec and Labrador. The new railway has carried nearly 4,000,000 tons to tidewater so far this year and with likelihood of reaching 6,500,000 tons before the close of navigation this season on the St. Lawrence. Trains hauling the ore average about 130 cars each. There is an average of about five trains daily, or a total of some 650 carloads of ore carrying some 50,000 tons per day. Due to the very great tonnage waiting to be mined a progressive annual increase in production.

Approval has been granted by the Board of Transport Commissioners for a change in route for the proposed pipeline which is to transport natural gas from Alberta to the industrial centres of Ontario and Quebec. The newly approved route passes across Northern Ontario at a point somewhat farther north than formerly planned, and will pass through such communities as Beardmore, Jellicoe, Hearst, Kapuskasing, Cochrane and North Bay—passing close to the gold fields of Porcupine and Kirkland Lake as well as the silver field of Cobalt, and allowing for a branch line to the Sudbury nickel fields. From North Bay the line would extend south through the district of Parry Sound by way of Orillia and Barrie to the industrial centres.

Northwest Power Industries (of which Frobisher Ltd. is the parent company) is proceeding with its billion-dollar proposal to harness the waters of northern British Columbia and the Yukon Territory in the plan to create a huge electro-chemical and metallurgical centre. The ultimate objective is the development of some 4,900,000 hydro-electric h.p. This may be accomplished in stages. The first stage would be 270,000 h.p. which would be utilized by the Frobisher-Ventures group in their proposed electrolytic smelter.

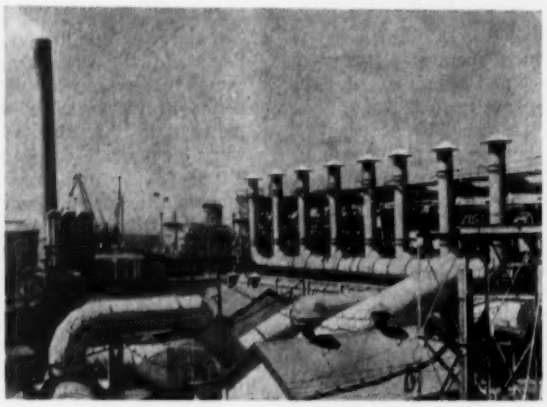
Australia

(From Our Own Correspondent)

Melbourne, September 1.

Activity in exploration for uranium in Australia has centred in two major localities; the Mount Isa-Cloncurry district in Queensland, where the potential big mine is the Mary Kathleen, in which Rio Tinto Ltd. and Australasian Oil Exploration Ltd. are associated, and where 10 diamond drills are at work; and the South Alligator River field, in the Northern Territory, in which locality two groups are opening up occurrences of importance. These groups are Northern Uranium Development-Uranium Mines, and North Australian Uranium Corporation with which is associated the Atlas Corporation of U.S.A. In the same region Uranium Development and Prospecting is also operating.

So far as the ultimate potentialities of these particular areas are concerned, several years may elapse before they are fully disclosed, but it is probable that the extent and value of the Mary Kathleen occurrence will be the first known with accuracy, and characteristics point to a large open cut proposition. Work by Northern Australian Uranium Corporation has, so far, indicated average grades of 0.65, 0.225 and 0.25 per cent uranium oxide at South Alligator River, but tonnages represented are not known.



A section of the Port Pirie smelter plant

The question of treatment plants is, naturally, in abeyance until mine proving and metallurgical investigation are further advanced, but it has been stated that results at the Northern Territory centres already indicate justification for plants. The Queensland Minister for Mines has stated that a company associated with the development of uranium production in the Mount Isa-Cloncurry area may soon decide to erect the first uranium treatment plant in Queensland, but which of the several large companies in the area has not been disclosed, though Mount Isa Mines Ltd. offered to erect a plant.

With regard to the attitude of the Queensland government it was stated that the State government will co-operate with the Atomic Energy Commission and that the State would not, itself, enter into the mining, treatment or sale of uranium, but would continue to give all practicable assistance to mining enterprises. It was pointed out that when production of uranium oxide began in that State, there would arise a demand for part of the production for use in Queensland.

CHANGE OF SOUTH AUSTRALIAN POLICY?

In South Australia, uranium mining has been a State government preserve, and the State's producing mine, Radium Hill, is government controlled and operated. Prospecting by the government has located an area of promise to the north of Radium Hill, at Mount Victoria Hut, but it is probable that policy will be altered, and this uranium area made available for operation by private enterprise, in which event it is rumoured that Western Mining Corporation would be interested.

The Radium Hill mine is producing concentrate for treatment at the plant which has been under construction at Port Pirie. This plant is reported to have commenced operation and it is understood that contracts have been made for the sale of uranium oxide to the Combined Development Agency. Long term arrangements for the sale of the final product are expected to lead to a visit from the U.K. Atomic Energy Authority. The Port Pirie plant has sufficient capacity for much larger quantities of ore than will be produced at Radium Hill mine.

STEEL EXPANSION

The steel industry produced 1,700,000 tons of finished steel products per year from 2,100,000 tons of ingot steel. The Australian consumption, or demand, is about 2,100,000 tons of finished steel products, leaving a shortage of 400,000 tons. To meet the expanding demand, the Broken Hill Proprietary Co. Ltd. and its subsidiary, Australian Iron and Steel Ltd., have, in the past five years, spent £A56,500,000 on plant and equipment and the end of expansion is not yet.

By the end of 1956, when the new open hearth furnaces at Port Kembla come into operation, the steel making capacity of the Port Kembla works of Australian Iron and Steel Ltd. will have been doubled since 1946. This development will be responsible for the erection of a second primary rolling mill at a cost of between £A8,000,000 and £A9,000,000 to roll ingots for the new hot strip mill.

A noteworthy event at the end of the month was the opening of the continuous hot strip mill at Port Kembla, the cost of which is £A30,000,000. In the next five years the Broken Hill Proprietary Co. and its subsidiaries plan to spend an additional £A67,000,000 on plant throughout Australia. The new hot strip mill has an installed capacity of 1,000,000 tons per year and will provide material for the flat steel products market. The new wide strip plant will make possible the operation of the first Australian tinplate plant, the largest single project undertaken by an Australian company since the end of World War II. Work in progress will add a further 350,000 tons to the steel production by the end of 1956, much of which will go to the hot strip mill. New rolling mills are being built at Newcastle, New South Wales, and at Kwinana, Western Australia. The tinplate mill is expected to be in operation by 1958.

SULPHURIC ACID PRODUCTION

Production of sulphuric acid has increased from 600,000 tons of mono acid in 1949-50 to 800,000 tons in 1954-55. A new plant with a capacity of 100,000 tons has been completed at Port Adelaide and other new plants and extensions are under construction elsewhere, which will bring total production to 1,000,000 tons per year. Australian soils require the use of superphosphate, and about 80 per cent of the acid production is used in the manufacture of fertilizer.

At the present time, two-thirds of the acid is made from brimstone, which is imported, and the balance is produced from local sulphide ores—lead, zinc, copper and pyrite concentrates. An objective in the sulphuric acid industry is to raise the manufacture from sulphide raw material to 65 per cent of the total output, and plant conversion to this end is proceeding. To forward the aim for utilizing local sulphur-bearing materials, the Sulphur Bounty Act has been amended; the total amount of bounty payable in respect of sulphuric acid produced in any one year must not exceed £A600,000.

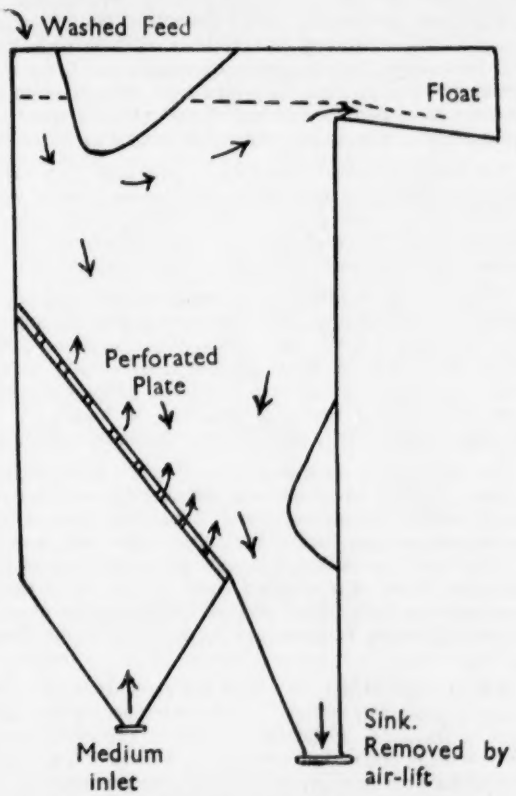
The Lead-Zinc Concentrator at Ramsbeck, Western Germany

The Ramsbeck mesothermal lead-zinc veins at Bestwig, Western Germany, are worked by the Vereinigte Bastenberg und Dornberg mines of the Stolberger Zink A.G., and current output averages 1,200 to 1,400 tons per day. The lead-zinc concentrator plant at Ramsbeck was visited by delegates to the International Ore Dressing Congress held at Goslar from May 8 to May 11, 1955, and in the following article the representative of *The Mining Journal* at the Congress describes the concentrator. This is the concluding article in a series of three describing particularly interesting installations visited by delegates to the Goslar Congress.

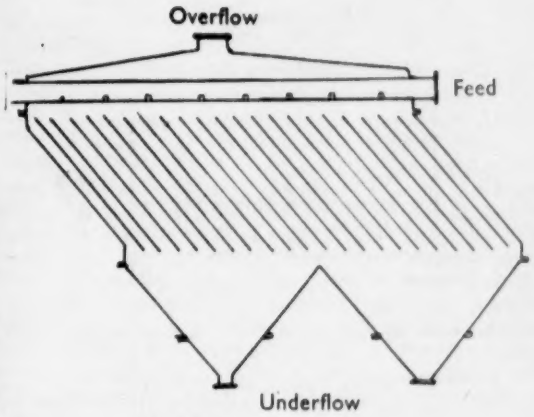
At Bestwig, Westphalia, about 100 km. East North-East of Cologne, the Ramsbeck mesothermal lead-zinc veins occur which are worked by the Vereinigte Bastenberg und Dornberg mines of the Stolberger Zink A.G. The orebody occurs in Devonian quartzites, gritstones and shales, and consists of galena and sphalerite in a quartz gangue with some subordinate pyrite, the minerals being fairly finely disseminated with liberation mesh under 0.3 mm. The lode dips at about 18 deg. and is stoped by a form of room-and-pillar method, advancing on strike.

The present output of the mine is 1,200 to 1,400 tons per day, the mill feed assaying 1.7 per cent Pb and 4.8 per cent Zn with 17 grm. of silver per ton. Crude mine ore is crushed in two stages to 40 mm. using two 1,000×500 mm. jaw crushers with fixed grizzlies in front of them, followed by two No. 4 Symons cone crushers with two 2,000×1,000 mm. for each crusher removing undersize in the feed.

The ore is then washed on a Niagara screen with a 7 mm. opening, the oversize passing to two Humboldt sink and float units rejecting about 50 per cent of the feed which is further washed, crushed and screened at 8, 12 and 25 mm. and sold for building material.



Humboldt sink-float tank.



Humboldt inclined-baffle densifier.

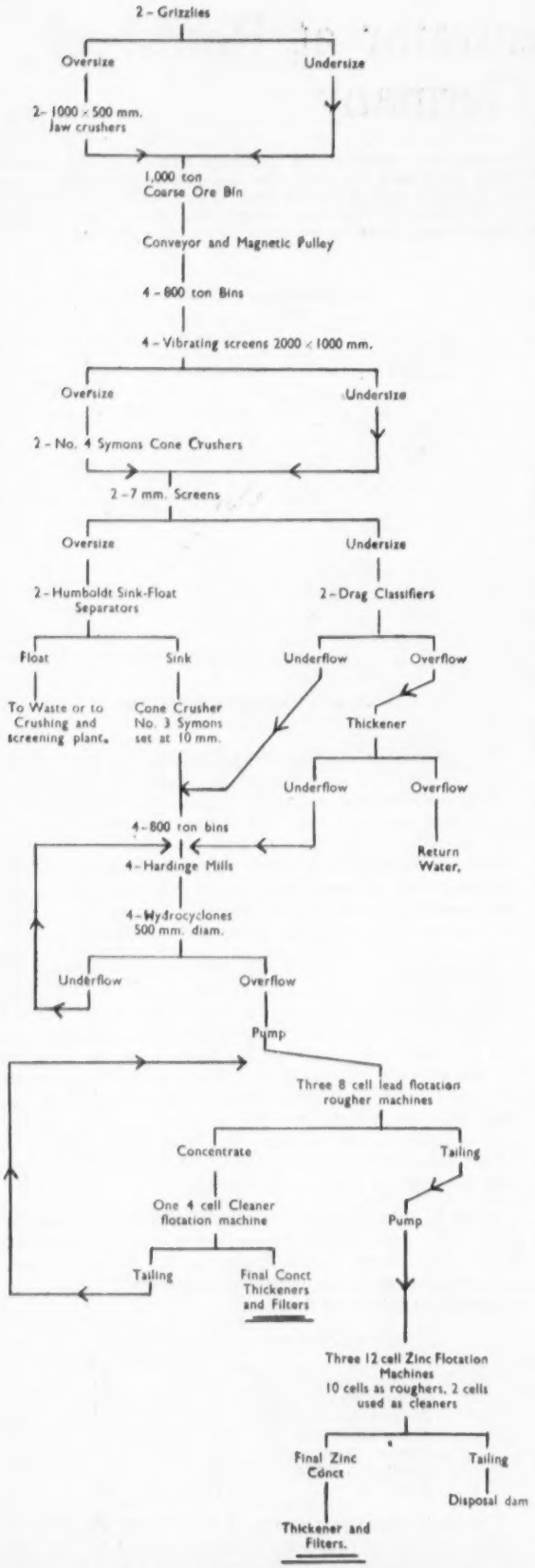
Normally only one secondary crushing and heavy media plant is operated and separation is carried out using a galena medium with a density of 2.76 which is cleaned by thickening and flotation. The tailing from this operation carries 0.08 per cent Pb and 0.15 per cent Zn. The sink product is reduced in a No. 3 Symons crusher to 10 mm. and joins the undersize from the 7 mm. screen after this has been deslimed in a drag classifier capable of handling 30 tons per hour, forming the feed to the ball mills.

Fine grinding is carried out with four Hardinge mills, 2,440×1,220 mm., each with a capacity of 44 to 48 tons per hour and working in closed circuit with hydrocyclones. The ground product containing 70 per cent −0.1 mm. and 100 per cent −0.3 mm. passes directly to the flotation section where a rougher galena concentrate is first made in three sets of eight cells which is cleaned once in one four-cell machine, cleaner tailing being returned to the feed of the rougher section. The lead tailing passes to three twelve-cell flotation machines of which 10 cells are used as roughers and two as cleaners.

Some 35 tons per hour can be treated in this flotation plant using a straightforward selective flotation involving floating the galena whilst depressing the sphalerite with cyanide followed by the normal activation with copper sulphate before sphalerite flotation.

Flotation Reagents	*Flotation Feed (grms. per ton)*
Sodium cyanide	44
Sodium ethylxanthate	155
Sodium hexylxanthate	88
Flotol (pine oil)	54
Sapinol (frother)	78
Copper sulphate	280
Lime	106

The lead concentrate assays 63-65 per cent Pb and 9 to 11 per cent Zn with recovery of 80 per cent of the lead, the zinc concentrate 50 to 52 per cent Zn and 3 to 3.8 per cent



Flowsheet of Ramsbeck Concentrator

Pb with a zinc recovery of about 90 per cent. The flotation tailing, however, still carries 0.15 per cent Pb and 0.25 per cent Zn.

Both lead and zinc concentrates are thickened in cones, the underflow of which feeds rotary filters and the overflow treated in Dorr type thickeners, overflowing clear water to the mill pond whilst the underflows are returned to the respective cones. The lead concentrate from the filters carries eight per cent moisture and is discharged into bin for shipment to the smelter but the zinc concentrate is dried in a Buettner unit after filtering when the moisture is reduced to five per cent before sending to the smelter.

Power consumption of the plant amounts to approximately 22 kWh./ton of crude ore and water consumption is some 120 cu. m. per hour or 1.7 cu. m. per ton of ore. Personnel comprises 85 operators, 10 foremen and 15 boys.

Heavy wear is experienced on all surfaces exposed to the ore being over 1 kg. per ton for reduction as the ore is most abrasive and investigations are being undertaken with a view to reducing this figure. To give some idea of the wear suffered by major parts, the abrasion on the manganese steel liners in the ball mills amounts to 178 grm. per ton, on grinding media (Smith's steel balls) 900 grm. per ton, on flotation machine rotors (grey cast iron) 28 grm. per ton, and on pump runners (grey cast iron) 50 grm. per ton.

It is claimed that the installation of the Humboldt dense media plant has been responsible for a saving of 250,000 D.M. annually and that the operating cost is 0.4 D.M. per ton of feed to the separatory vessel. Loss of galena in the operation is around 50 grm. per ton of feed.

OPERATION OF THE HUMBOLDT SEPARATOR

Although the Humboldt separator is well known in Europe it is not widely known elsewhere and an outline sketch of the separating tank appears on these pages. As will be seen the tank possesses no moving parts, the sink sliding down an inclined perforated plate through which the medium is caused to rise and being removed from the bottom of the separatory chamber by means of an air lift.

The washed feed is deflected by a curved baffle in a downward direction, the float rising and flowing over a weir. Both float and sink products are washed in the normal manner whilst the draining from the first section of the screen enters the medium reservoir and is recirculated.

This medium is lifted to a funnel situated just above the main vessel so that it flows by gravity into the bottom of it and rises through the perforated plate. About 1,800 cu. m. per hour of air is necessary to provide the necessary pulp and medium elevation in this plant. Diluted medium from the washing screen is densified by means of an arrangement of inclined plates within the densifier chamber.

The feed enters through a pipe or pipes in which are aranged slots to effect uniform distribution over the inclined baffles. During the flow of the pulp through the spaces between the baffles, the solids settle and proceed to slide down the incline, accumulating at the apex of the discharge cones. The clarified water on the other hand, flows upwards in the upper layer of the interspaces formed by the baffles and is discharged by means of a pipe from the top.

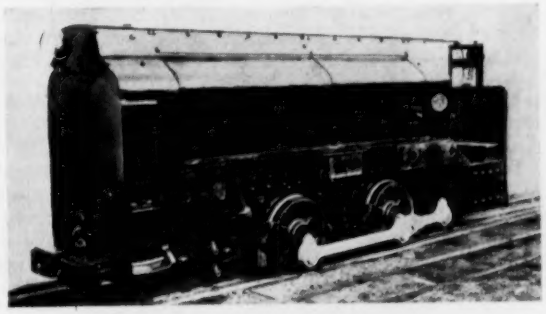
It is anticipated that in future the proportion of finely intergrown ore will increase with a corresponding development of difficulties in flotation technique, and experiments are now being undertaken to ascertain whether it is possible to produce both high grade lead and zinc concentrates by collective flotation followed by the selective separation of a mixed concentrate.

Locomotive Power for the Mining Industry

By W. A. SMYTH

The problems connected with the provision of an effective mine transportation service on surface vary widely from those relating to underground haulage systems, although certain basic considerations apply equally to both spheres of operation. In the following article, W. A. Smyth, Managing Director, W. G. Bagnall Ltd., outlines the differing conditions encountered in surface and underground haulage in the United Kingdom and overseas mining fields. Relevant formulae and statistics are presented. The locomotives described below have been manufactured by W. G. Bagnall Ltd.

Adequate transportation facilities are particularly important in the mining industry. No other industrial activity produces a comparable amount of material per man-hour, and this material must be handled expeditiously if transport is not to become a limiting factor to the output of the mine. Track layouts and ancillary installations must be properly designed and maintained and the motive power must be reliable, efficient and suited to the physical conditions under which it has to operate. Permissible axle loading, curves and grades to be negotiated, weight of train to be hauled, average train speed, type and cost of fuel available—these and many other factors must be taken into consideration in deciding on the type and power of the locomotives to be used. These considerations apply to haulage both above and below ground although the problems involved in providing an effective transportation service in these two spheres are very different.



The 50 h.p. Deutz engined locomotive.

SURFACE AND UNDERGROUND TRENDS

Below ground the narrow gauge, diesel-engined, mines locomotive tends to become the accepted haulage unit. It has proved itself in service in many countries and the ease with which it can be flame-proofed for use in gassy mines is a great advantage. One of the earliest locomotives of this type put into service in Britain was a 50 h.p. Deutz engined locomotive supplied to Kings Hill Colliery, Lanark, by W. G. Bagnall Ltd. in 1935.

Above ground the conventional steam locomotive still holds its own although an increasing number of diesel electric and diesel mechanical units are now going into service. A very great variety of types and designs of steam locomotives are found on mining installations in different countries as the loading and operating conditions vary considerably.

MINING LINES IN U.K.

In Great Britain most colliery and mining lines are of standard (4 ft. 8½ in.) gauge and the locomotives most usually selected are saddle-tank units with either two coupled axles (0-4-0) or three coupled axles (0-6-0) and with cylinder diameters of from 12 in. to 18 in. The 0-4-0 type is particularly suitable for use in locations where curves of short radius have to be negotiated but limitations of axle-loading restrict this type to the smaller powers except where heavy section rail is used.

A rough guide, in this connection, is that the maximum axle load should not exceed one-fifth of the weight per yd. of the rail. Thus, if the weight of the rail is 80 lb./yd. the maximum axle load is 16 tons. With the 0-4-0 wheel arrangement this will give a total locomotive weight of 32 tons and with the 0-6-0 wheel arrangement a total locomotive weight of 48 tons. Consider an 0-4-0 and an 0-6-0 locomotive each having 16 in. x 24 in. cylinders, wheels 3 ft. 6½ in. dia. and a working pressure of 180 p.s.i. The tractive effort at 85 per cent working pressure, in each case, is 22,118 lb. Specific examples show the 0-4-0 locomotive to weigh 40 tons, giving an axle load of 20 tons, while the 0-6-0 locomotive weighs 41.5 tons giving maximum axle load of 14 tons. These two locomotives are designed for an economical speed of 25 m.p.h. and they will haul approximately 1,300 tons on the level. The 0-4-0 engine will negotiate curves of 58 ft. min. radius and the 0-6-0 curves of 190 ft. min. radius.

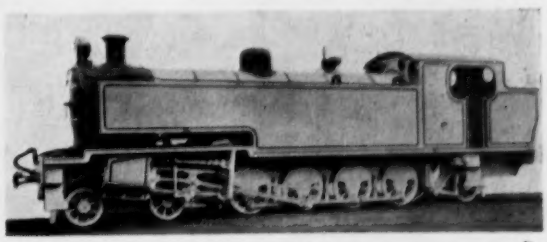
SURFACE HAULAGE OVERSEAS

Surface haulage at mines in overseas countries calls for locomotives of rather different design from those used in Great Britain. Rail gauges are usually narrower (2 ft., 2 ft. 6 in. or 3 ft. 6 in.) and the condition of the track usually requires truck or bogie wheels before and behind the coupled wheels. Types of wheel arrangements frequently met with are 2-6-2, 4-6-2 and 4-8-2.

A 2-4-2 pannier tank locomotive supplied to the 2 ft. gauge track of the Waihi Gold Mining Co. in New Zealand has cylinders of 10 in. dia. by 16 in. stroke, driving wheels of 2 ft. 6 in. dia. and a working pressure of 180 p.s.i. The tractive effort at 85 per cent working pressure is 8,165 lb. and the locomotive weighs 20 tons.

APPLICATIONS ON THE RAND

A 4-8-2 type supplied to a number of gold mining companies on the Witwatersrand is designed for the 3 ft. 6 in. gauge ; the cylinders are 16 in. x 24 in., the coupled wheels are 3 ft. 3in. in dia., the working pressure is 180 p.s.i. The tractive effort at 85 per cent working pressure is 24,200 lb. and the locomotive weighs 58 tons in working order. One type of locomotive supplied to a Rand gold mine in which no truck or bogie wheels are employed is an 0-8-0 side tank locomotive with cylinders 16 in. x 24 in., coupled wheel dia. of 3 ft. 3 in. and working pressure 180 p.s.i. The tractive effort is the same as the 4-8-2 type but the weight



A 4-8-2 type locomotive supplied to a number of gold mining companies on the Witwatersrand

is only 41 tons owing to the omission of the bogie and trailing truck.

It should be borne in mind that the tractive efforts quoted are those available at starting and represent the effort available at the driving wheel rim. To obtain the pull available at the drawbar for useful haulage, the power required to move the locomotive itself must be deducted from the rated tractive effort. The tractive effort of a two cylinder steam locomotive is calculated from the formula :—

$$\frac{T = D^2 \times S \times Pm}{W}$$

Where T —Tractive effort in lb.
D —Dia. of cylinders in in.
S —Piston stroke in in.
Pm—85% Boiler pressure in p.s.i.
W —Driving wheel dia. in in.

In deducting the power required to move the locomotive itself it is usual to calculate this as 20 lb. per ton weight of the locomotive. Thus a 40 ton locomotive will require 40 x 20=800 lb. to move itself and this should be deducted from the calculated tractive effort to find the useful effort available at the drawbar. In calculating the resistance of rolling stock a figure of 16 lb. per ton may be used. Thus, to start a train of 20 trucks each weighing 20 tons on the level will require a pull at the locomotive drawbar of 20 x 20 x 16=6,400 lb.

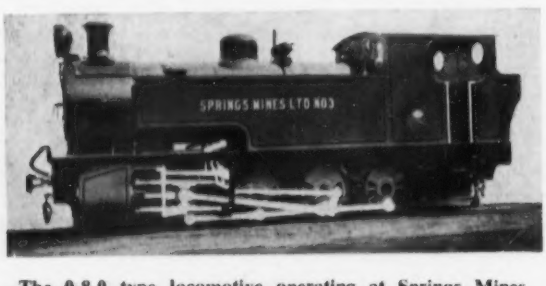
EXPANSION OF DIESEL USAGE

Diesel locomotives, with either mechanical or electric transmission, have been used for surface haulage for the past 20 years or so and their use is increasing rapidly in most countries where mining operations are carried out. As in the case of steam locomotives, diesel units in Great Britain tend to be rigid-frame machines carried on two or three axles while those in overseas countries are frequently, though not always, mounted on bogies. The rigid-frame locomotives are usually driven by jack-shafts and coupling rods, in the case of mechanical transmission, and by axle-mounted traction motors in the case of electric transmission.

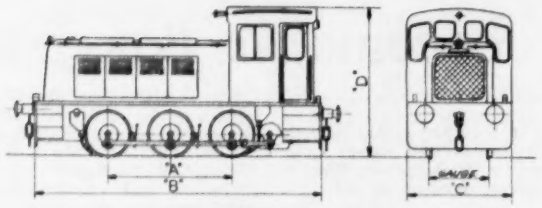
In bogie locomotives a cardan shaft, with universal coupling, takes the drive from the gearbox mounted on the main frame to the bogie wheels which are connected by coupling rods to secure adhesion or if electric transmission is used, traction motors are mounted on the bogies and connected electrically to the main generator on the locomotive frame, through suitable control gear. A diesel mechanical shunter supplied to the Ashanti Goldfields Corporation as long ago as 1933 was a double-bogie locomotive fitted with a 62 b.h.p. Gardner engine, fluid flywheel and two-speed epicyclic gearbox. This unit is still giving satisfactory service.

N.C.B. SHUNTER

In contrast an 0-6-0 diesel mechanical shunter designed for the National Coal Board is powered by a 220 b.h.p. National engine and is fitted with a four-speed Self Changing Gear Co. C.A.4 gearbox, Fluidrive traction-type hydraulic coupling and Wiseman 15RLGB reverse and final drive box. The locomotive weighs 28 tons in working order and the speed and tractive effort in each gear are :



The 0-8-0 type locomotive operating at Springs Mines, South Africa



The 0-6-0 type shunter

Gear No.	*Speed (m.p.h.)*	*Tractive Effort (lb.)*
1	3.8	17,250
2	6.7	9,840
3	10.1	6,510
4	15.6	4,230

The first cost of a diesel locomotive may be twice that of a steam engine of comparable power and it lacks the rugged simplicity and reliability which users have come to expect from the steam locomotive. But in many locations the operating costs of the diesel are much less than those for steam and the high traffic availability of diesel locomotives gives them a great advantage where continuous shunting operations are involved. A diesel engined locomotive can remain in traffic service for 24 hours of the day, for days on end, and in this respect the conventional steam locomotive cannot compete with it.

STEAM STORAGE UNITS

In certain cases where the haul is relatively short and where adequate supplies of high pressure steam are available from stationary boilers, a fireless or steam storage locomotive may be used with advantage. In this type of locomotive the conventional boiler is replaced by a heavily insulated steam reservoir which is charged with steam from an outside source. The charging operation takes from 15 to 20 min., depending on the reservoir size, and the locomotive will work from three to four hours on one charge.

Formerly used mostly in places where the fire risk or the need for absolute cleanliness precludes the use of a conventional steam locomotive, these fireless locomotives are now finding a new field of application in short haul shunting at power stations. By arranging the charging schedules to suit it is possible to use the locomotives to balance the load on the stationary boiler plant so that they become, in effect, mobile thermal accumulators. In such circumstances they are exceedingly economical to operate and, as there is no boiler to wash out and no fire to clean, the traffic availability approaches that of a diesel locomotive. A locomotive of this type, one of a number supplied to the British Electricity Authority, weighs 27 tons in working order and has a tractive effort of 11,477 lb. The charging pressure is 250 p.s.i. and the working pressure 80 p.s.i.

VALUE OF MAINTENANCE

Whatever type of motive power is employed, the best results will only be obtained if the locomotives are properly maintained. Routine examinations must be carried out at fixed intervals and worn or defective parts replaced before they cause a breakdown. In the case of steam locomotives care should be taken that the boilers are regularly and effectively washed out and that internal examinations are carried out. All examinations and repairs should be carefully recorded and the records should be periodically examined by the superintending engineer. The provision of a reliable transportation service depends not so much on the type of motive power employed as on the care with which the locomotives are operated and maintained.

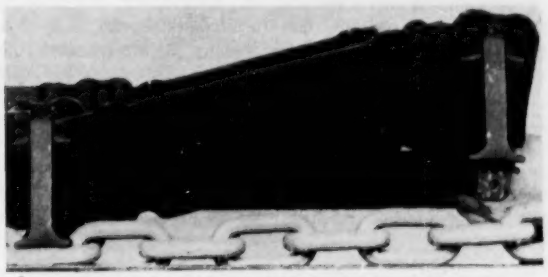
Recent Developments in Conveyor Design

By A. GRIERSON, B.Sc., A.M.I.Min.E.

Since the publication in *The Mining Journal* of the series of articles entitled *The Design and Use of Belt Conveyors in Mines* by A. Grierson, developments in the field of conveyor design have continued apace. The following article, by the same author, gives an indication of these developments and will be supplemented as and when new types of conveyors are installed in mines in different parts of the world.

In an endeavour to overcome the stress limitations of conventional rubber belt conveyors, manufacturers in Europe have for some time been working on the design of a conveyor in which the sole function of the belt is to carry the load. In the conventional rubber belt conveyor, not only does the belt have to hold the load but must, in addition, transmit the stress required to move the conveyor against friction and gravity. On long hauls these factors may well require a belt tension far in excess of the permissible working strength of normal belts. Although this idea of restricting the work done by the belt to carrying the material is by no means new, it was not until fairly recently that conveyors having the desired features became established.

Work in Britain has primarily been aimed at the development of a conveyor in which the stress is carried by steel wire ropes or cables running alongside the belt, whereas on the Continent the trend has been towards the use of chains as the means of stress transmission. The British



Prunte steel conveyor showing assembly of troughs.

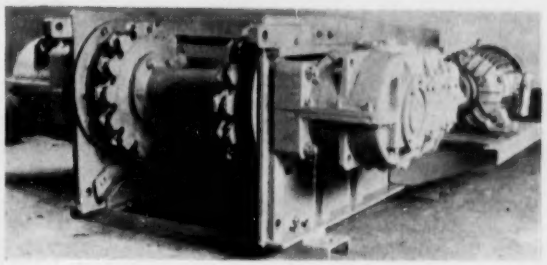
Cable Belt Conveyor has already been fully described in *The Mining Journal* (April 10, 1953), and it is proposed in this article to consider some recent types of chain-driven conveyors, so affording an indication of the developments in this sphere.

THE HORSTERMANN CONVEYOR

In the Hörstermann Rubber Belt Conveyor, manufactured by Gebr. Hörstermann G.m.b.H., the belt is supported and moved by steel bearing plates carried on a chain running between the upper and lower strands of the conveyor belt. Every second or third link of the driving chain is provided with a bearing plate, some 4 in. sq., which supports the top strand of the belt. In the lower section of the conveyor these bearing plates press on the upper surface of the return strand. The combined effect of this large number of bearing surfaces is sufficient to move the loaded belt without any necessity for a positive connection.

In the earlier type Hörstermann conveyors the driving chain was of the flat plate link type, but such chains, however, have been superceded by round steel link chains. These are stronger for equal weight and according to the manufacturers permit much higher chain speeds to be used than is customary with the flat plate type.

In the latest models the centre roller of the idler sets on

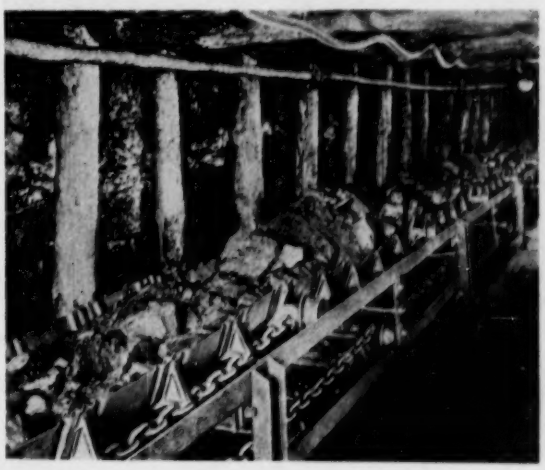


Driving head of Prunte steel conveyor.

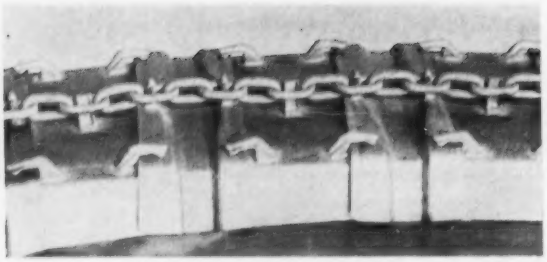
the conveyor framework is removed, enabling a guide frame to be incorporated in the framework. This guide frame runs the length of the conveyor and carries rollers fixed to the driving chain, so ensuring true running of the conveyor. A particularly pleasing feature of the Hörstermann conveyor is the ease with which intermediate drives may be interposed between the receiving and discharge ends of the conveyor. This can be easily effected by coupling the tail end sprocket of the initial conveyor to the driving sprocket of the intermediary conveyor. Thus, although there are two separate conveyor driving chains the rubber carrying belt is continuous. By this means it is possible to extend the belt to cover almost any distance in a straight line without the need for transfer points.

THE PRUNTE STEEL LINK CONVEYOR

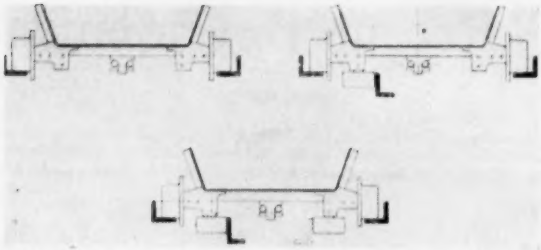
The cable belt conveyor and the Hörstermann conveyor are typical examples of the adaptation of conventional rubber belt conveyors to heavy duty primary haulage units. Other manufacturers have concentrated attention upon the development of steel plate conveyors. In this type, as the name implies, steel plates are used instead of rubber, but, as before, the tension is transmitted via an external chain. Interesting examples of this type were shown recently at the



The Prunte Steel Link Conveyor.



Assembly of troughs on Prunte flexible conveyor.



Position of guide rollers on Prunte centre chain conveyor. Left to right: Types one, two and three.

Paris Exhibition held in connection with the Centenary Celebrations of the Societe de L'Industrie Minerale. Two such conveyors were exhibited by Kettenwerk Prunte and Co. G.m.b.H.

One of the difficulties of older type steel conveyor belts has been the inability to run them at speeds comparable to rubber belt conveyors. The Prunte Steel Link Conveyor, a new belt design, has small light troughs and short driving chain pitch, so enabling speeds of up to 300 ft. per min. to be achieved. At this speed, and with a trough width of 25 in., the capacity of the conveyor is 360 cu. ft. per min.

BELT CONSTRUCTION

The belt itself is built up of short bearing troughs overlapping the sections of the main troughs. The bearing troughs are fitted with brackets to which a driving chain is attached on each side. The driving chains are light round steel chains having a 64 mm. pitch. The standard chain length has 90 links and the total length including the connecting link is 5,760 mm. (19 ft. approximately). Having such a small chain pitch the driving sprockets around which the chain passes require many teeth and consequently there is smooth running of the chain around the sprocket. This, of course, contributes towards the smooth running of the carrying belt and allows relatively high belt speeds.

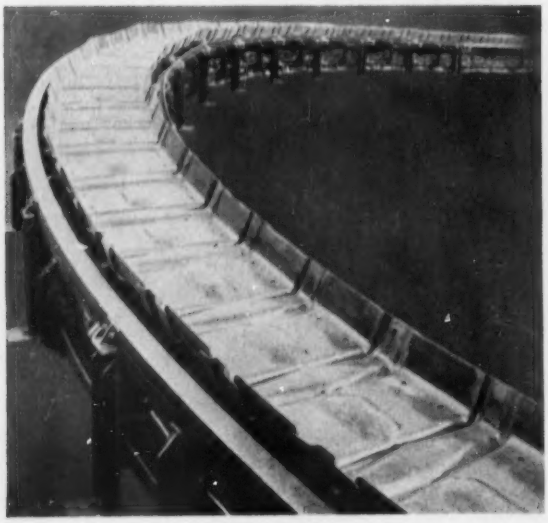
The troughs themselves are capable of extremely hard work and as such are well suited to the carrying of heavy ores. The carrying troughs are supported by rollers attached to the under side of every fifth bearing trough. This gives a roller interval of approximately 6 ft. 3 in., but this interval can be varied according to operating conditions. The rollers are oil sealed and after installation need no further attention. They run on angle irons forming the lateral members of the conveyor structure.

The standard width of the carrying troughs are 540 and 640 mm., and the conveyor drives are arranged to give a speed range of 180 to 300 ft. per min. The conveyor structure is capable of a five deg. movement up or down, thus enabling floor undulations to be negotiated.

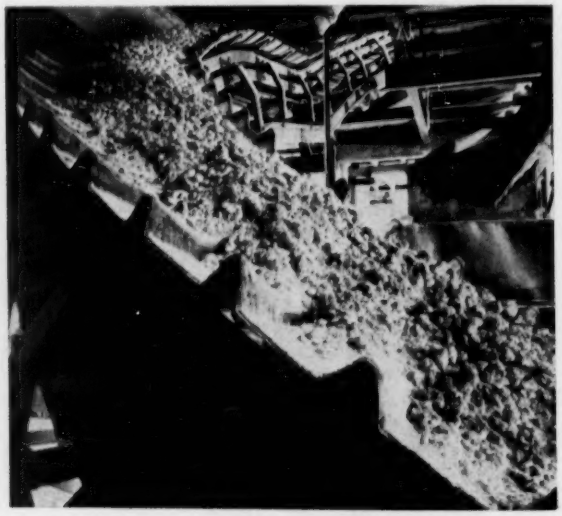
The conveyor driving unit is compact and is arranged for either single or double-sided drive. The unit illustrated is 55 h.p. with a single drive, or 110 h.p. with double drive. For exceptionally heavy duty additional driving units can be placed at the tail end of the conveyor. The Steel Link conveyor, despite its sturdy construction, only takes about 25 per cent more h.p. than the average rubber belt conveyor of comparable capacity and, of course, has the decided advantage of durability plus the fact that it can be used at distances which would call for a series of conventional conveyors. For example, the Type 640/20 can carry 485 tons per hour at 300 ft. per min. over a maximum horizontal distance of 2,400 yd.; a duty far in excess of any single conventional belt conveyor. The Prunte Steel Link Conveyor is designed specifically for heavy duty on straight roadways but the same firm has also produced a flexible steel belt conveyor. This is the Prunte Centre Chain Conveyor.

THE PRUNTE CENTRE CHAIN CONVEYOR

The Prunte Centre Chain Conveyor has the advantages both of a heavy duty straight conveyor and of a snaking or flexible conveyor. As with the previous type the carrying

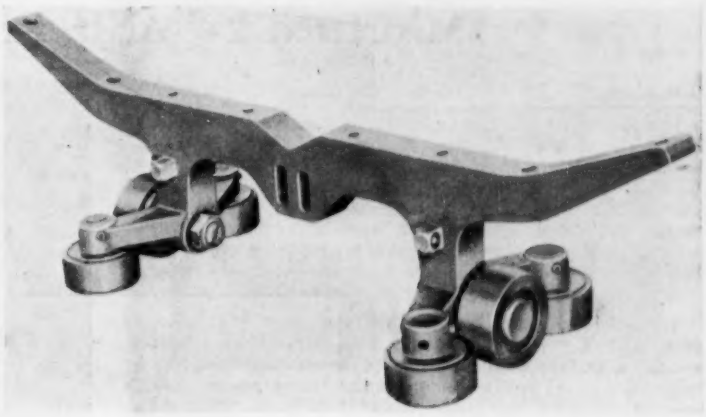


The Prunte centre chain flexible conveyor.



Folded belt conveyor on use on curve and gradient.

belt consists of short bearing troughs overlapped by rather longer sections of troughs. The illustration shows the carrying belt inverted and, as will be seen, the bearing troughs fit into lugs on the main troughs. The driving chain is locked over two projections on the underside of each bearing trough, and also is loosely fitted over a projection welded on to the base of each main trough. At 4 ft. 9 in. intervals, carrying rollers are attached to the bearing troughs. These rollers are vertical and horizontal, and run in guide rails. Type 1 only has vertical rollers and is the standard design suitable for curves down to 30 m. radius. Type 2 is similar to 1 but has a single horizontal roller on one side. This enables the conveyor to negotiate curves down to 10 m. but on one side only. Type 3 has two horizontal rollers and thus can negotiate curves down to 10 m. on either side of the conveyor. In special cases bends down to 3 m. radius are possible but this necessitates reducing the distance between the roller axles.



Carrying trestle of the folded belt conveyor showing support and guide rollers

The belt is moved by a strong round steel chain having a minimum breaking load of 30,000 kg. The maximum length at which the conveyor will operate depends of course on the conditions of loading inclination, number and severity of bends, etc. Intermediate drives can be incorporated if power requirements warrant this. The driving unit of this conveyor is similar to that illustrated but, of course, has only a single driving sprocket. For heavy duty a fluid coupling is used to transmit the drive from the helical spur gearing to the sprocket shaft.

THE FOLDED BELT CONVEYOR

This is yet another German flexible conveyor and is manufactured by Gerwerkschaft Eisenhutte Westphalia. It differs from the types previously described in that the carrying belt is a combination of both rubber and steel.

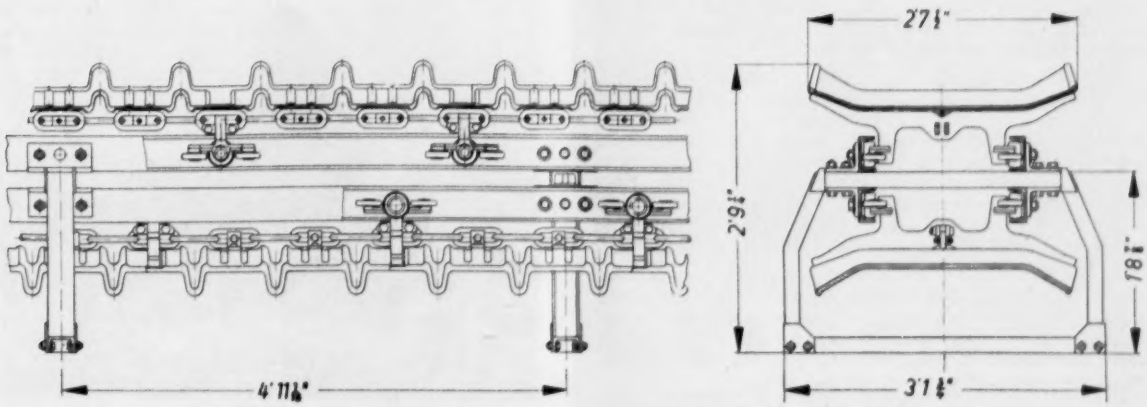
The 80 cm. wide belt consists of sections of rubber-covered trough-shaped corrugated steel strips bolted together. The belt is carried on roller mounted carriers set transversely at 72 cm. centres along the run of the conveyor. These carriers are fitted with horizontal and vertical rollers which run freely in rigid lateral guides within the conveyor structure. The vertical rollers prevent the belt from tilting whilst the horizontal rollers constrain the belt transversely. By means of appropriately shaped rigid guides the rollers are caused to follow any path and so the belt can be guided in the required course. When negotiating a curve the corrugations in the steel strips allow the belt to be compressed on the inside edge, and stretched on the outside edge.

FACTORS OF OPERATION

The belt is moved by means of a chain attached to the middle of the supporting carriers and driven by a sprocket in the driving head. Speed can be varied and with a belt speed of 265 ft./min. the capacity of the conveyor is 11,800 cu. ft. per hour, this being equivalent to approximately 250 tons of run-of-mine coal per hour. This conveyor is extremely robust and as such is eminently suitable for heavy duty. It can be used on curves 9 ft. 10 in. radius and on gradients up to 1 : 7.

The conveyor can be operated in either direction and intermediate drives can be introduced. The driving units are standard and are similar to those used on the Westfalia Panzerförderer face conveyor. The motor and gear box are in line with the conveyor run so making for compactness of driving unit. Normally, one 55 h.p. driving unit is used but double-sided driving may be employed if heavy duty is contemplated.

Folded conveyors have for some time been used successfully in both coal and metal mines and by virtue of their small operating radius they have been spiralled to enable high capacity lifts in surface excavations.



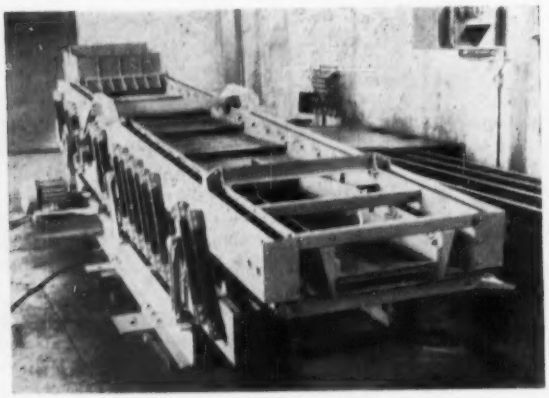
Gerwerkschaft Eisenhutte folded belt conveyor

MACHINERY AND EQUIPMENT

The Binder System of Vibrating Conveyors

Irrespective of whether the vibrating conveyors here described are ultimately designed to serve either as conveyors or screens, they consist of the following basic parts: Two oscillating frames or elements, one arranged vertically above the other, the two frames being connected together by leaf springs; connecting bars and associated bearing supports; the drive, consisting of a direct acting double eccentric system which causes the two frames to vibrate against each other; and the driving-motor which can be mounted above, below, or at the side.

The binder system is based on the principle of two masses vibrating in a reciprocating action. The characteristics of the system are that the vibrating masses of the system are perfectly balanced, i.e. the two vibrating elements move against each other in such a way that the forces due to the kinetic energy of the oscillating masses are balanced as regards magnitude and direction at all points on the reciprocating cycle. It thus follows that the vibrating masses transfer no forces or momentum to the supports or foundations of the machine. In addition the balancing of the masses admits the use of relatively great accelerations—up to six times the acceleration due to gravity—and large angles of projection and long trajectories.



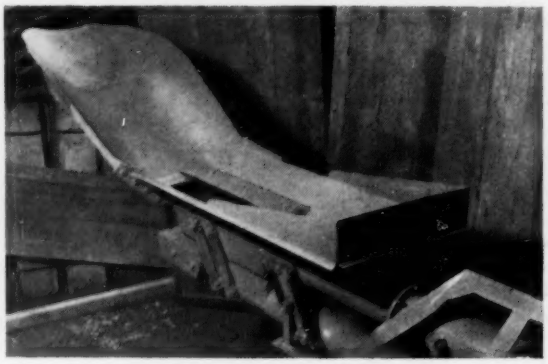
Larger type screen for operation in "binder" system

A further characteristic is that the mass forces of the vibrating elements and the elastic forces of the springs are in resonance, hence there is a continuous interchange of energy between the kinetic energy of the masses and the potential energy of the springs. The numbers, positions and elasticity constants of the resonance springs are so arranged as to absorb the kinetic energy of the oscillating masses. This cancellation within the system of the mass forces by the elastic forces of the resonance springs results in the bearings of the eccentric drive being unaffected by the interplay of the forces involved and they are consequently exposed to very little stress.

The system is operated by a positive drive consisting of a double eccentric arrangement which permits the same impulse both as regard direction and intensity to be driven simultaneously to all the vibrating parts. This arrangement results in uniform positive travel of the material being conveyed. In addition it permits control of the amplitudes of the two vibrating elements allowing the machine to be regulated to suit the requirements of either coarse or fine screening or the varying conditions regarding transportation of material.

As a general rule, the components of the oscillating elements should be so designed to combine a maximum of inertia with a minimum of weight. This fundamental requirement is not easy to meet where vibrating conveyor troughs and screens are concerned. However, the problem has been solved by developing a new system of vibration beams.

Two such beams are arranged one above the other on each side of the conveyor or screen. Each pair of side beams are connected together by symmetrically arranged resonance springs thereby forming a two-mass system capable of vibrating. The pairs of side vibration beams are joined by transverse yokes to form a frame to accommodate the conveyor troughs or vibrating screens. This construction has the advantage that it does admit the building of vibrating conveyors and screens in sizes and lengths never before achieved.



Vibrating conveyor Type R10

Vibrating tube conveyors are eminently suitable for the transport of hot materials with temperatures of up to 500 deg. C. and are able to overcome gradients of up to 30 deg. and a motor of 10 h.p. is sufficient to operate such a conveyor carrying hot materials at the rate of 180 tons per hour. The manufacturers are the Ludwig Binder Company, Austria, whose various conveyors are being built in the United Kingdom under licence by McKenzie and Brown.

The vibrating conveyor, Type R10, known as the Binder Baby, produced by the same manufacturers, represents a universal small conveyor which is worthy of special notice because of its high capacity and limited consumption of power. Because of its low weight (15 kg. for a length of 1 m.) and its small height (30 cm.) the Binder Baby can be easily transported and can be erected without any foundation or support, and may even be suspended on roof-construction or wall-ledges.

American Dumper Manufactured in U.K.

It was announced recently that the Birtley Co. Ltd. had entered into a manufacturing agreement with Athey Products Corporation, United States. It is now reported that the first equipment of the Athey range to be brought into production at the Birtley works will be the PR21 Rear Dump Wagon designed to operate in association with the Caterpillar Tractor Company's DW21 Wheeled Tractor.

The PR21 rear dump wagon

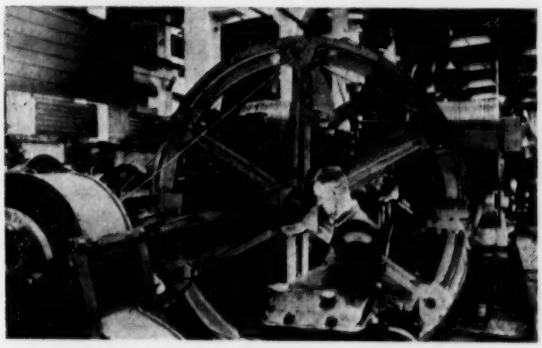
An innovation in the earth moving field of construction, the PR21 and DW21 can haul at 20 m.p.h. loads of 28 tons. The wide, open-topped hopper has a capacity of 22.5 cu. yd. heaped on a 1:2 slope. The hopper opening is 14 ft. x 9 ft. and a sturdy box-beam section around the top, sides and rear of the body allows lip loading without damage.

The construction of the PR21 is of a strength that will withstand the impact of big rock. The all-welded body has a 3-layer bottom built up of ¼ in. steel lower plate, an oak shock absorbing layer and ¼ in. steel top plate. Powerful Athey hydraulic hoists tilt the trailer body to 60 deg., providing fast, clean dumping of any material well clear of the tyres, and heaped load can be ejected in 18 sec. Power for the hoists is provided by a pump situated on the rear of the tractor, while the body pivots on the draftbeam.

The dumper track is 115 in. which with low centre of gravity provides exceptional stability. The DW21 tractor is powered by a six-cylinder CAT diesel engine of 275 b.h.p. with five travelling speeds, from 2.16 to 20 m.p.h. The hydraulic steering is positive at all speeds and 90 deg. turning gives non-stop turns in 34 ft., timing gears assure correct angle between tractor and dump wagon. The weight of the tractor is 27,200 lb. and the dump wagon 33,000 lb. unladen.

Steel Ropes for Aerial Ropeway in India

Two ropes now being manufactured in the Scottish factory of British Ropes Ltd. are destined for use on an aerial ropeway transporting coal in India.



Steel wires being stranded at the Scottish factory of British Steel Ropes Ltd.

Each rope consists of six strands composed of seven steel wires, total length being six miles and weight 34 tons. The machine illustrated is capable of manufacturing steel wire ropes weighing 80 tons.

Sodium Lighting for Coal Picking Belts

Lady Victoria Colliery, in the Lothians Area of the Scottish Division of the N.C.B., has recently experimented with the use of sodium lighting over a coal picking belt. The colour rendering of sodium lamps, more familiar as a streetlighting medium, makes it remarkably easy to distinguish dirt from coal. Since it is reported as almost impossible for dirt to go undetected beneath this lighting the amount of dirt inadvertently left in the coal is reduced to a minimum. So successful has this installation proved that two belts in a colliery at Newcraighall have been similarly equipped, while four more belts at Lady Victoria Colliery are at present undergoing conversion.

The General Electric Co. supplied the equipment for these installations. On the original belt at Lady Victoria Colliery 80 w. Osram sodium lamps are housed in twelve dispersive reflectors along the centre line of the belt. The reflectors are vitreous enamelled grey outside and white inside. A sorbo-rubber gasket between the reflector and its glass visor makes the fitting completely dust-tight. The metal frame supporting the glass is secured by two thumbscrews and hinged to facilitate lamp changing.

The control gear and fuses for the fittings are accommodated in boxes secured to the roof trusses by special brackets and connected by conduit to each other. The reflectors are likewise suspended by conduit from the boxes.

G.E.C. sodium lighting over a coal picking belt at Lady Victoria Colliery

Mine Drills for Yugoslavia

Holman Bros. recently have contracted to supply civil engineering equipment worth £34,000 to the Konstruktor and Kokin-Brod organizations in Yugoslavia. Both organizations are to use Holman equipment in the construction of hydro-electric dams and tunnels.

The equipment includes over 100 rock drills, Silver 3 units and F.L. 200 machines, and thus typical mine drills will work under the near-mine conditions of tunnelling operations. Other equipments supplied will include compressors, rippers and air winches.

It will be recalled that the Silver 3 medium lightweight handril was demonstrated on February 12, 1954, at the Acton works of Holman Bros. Designed for use with the airleg, the unit combines high speed with lightness of blow. The Silver 3 has a bore of 3 in., a stroke of 1⅛ in. and weighs 53 lb. on dry drilling or 55 lb. on wet. Rotation is 1/30, and either ¾ in. or 1 in. hexagon shanks can be taken.

The Konstruktor operation is undertaken on behalf of the hydro-electric department of the Croatian Republic at Vlasinaw, while the Kokin-Brod work is in Serbia on the Uratz River.

The "Silver 3" in civil application, operating at 115 p.s.i. in the Allt-na-Lairige project

TECHNICAL BRIEFS

Electroless Plating on Nonmetallic Materials

The method of electroless plating has now been applied to the deposition of nickel on plastics, wood or ceramics (U.S.P. 2,690, 401-3). The reducing agent is hypophosphite in a concentration of 0.15-0.35 moles per litre, the baths having a pH of 4.5-5.6. The nickel/hypophosphite ratio varies between 0.25 and 0.6 and a small amount of sodium succinate is added as a buffer.

Growth nuclei must be provided for the nickel and substances which catalyze the oxidation of hypophosphite to phosphite such as iron, cobalt, nickel, copper, silver, gold, palladium and platinum are all suitable for this purpose. The material to be plated must be freshly abraded and the catalytic material incorporated in the surface. This may be done, for example, by dry blasting the surface with emery powder containing 5 per cent catalyst. Alternatively the freshly abraded surface may be immersed in dilute palladous chloride solution and then in the hypophosphite.

Manganese Recovery from Low-Grade Ores

Considerable tonnages of manganese ore occur in Aroostook County, Maine, but the deposits contain only between 5 and 20 per cent manganese whereas a figure of not less than 40 per cent is called for by the steel industry. The method of recovery from these ores has been described by MacMillan and Turner (U.S. Bur. Mines Rept. Invest. 5082).

Beneficiation by normal ore dressing techniques was not found to be possible and satisfactory recovery was finally obtained by roasting the ore with calcium chloride and condensing the sublimate. The ratio of calcium chloride to ore was 0.8 and for a 3-hour chloridization roast at 1,100 deg. a recovery of 90 per cent of the manganese and 40 per cent of the iron was obtained. Chloridization of the ore with hydrochloric acid gas was found to proceed satisfactorily between 950 and 980 C. The overall recovery was found to be influenced by the time and temperature of the roast, the ratio of calcium chloride to ore and the rate of flow of the sweeping gas.

Electrolytic Production of Uranium

A method for the production of uranium powder by an electrolytic method has been claimed by W. C. Lilliendahl *et al* of the United States Atomic Energy Commission (U.S.P. 2,690, 421). A molten solution of KUF_5, UF_4, or UCl_4 in an 80 : 20 mixture of calcium chloride and sodium chloride is electrolyzed in a graphite crucible at 900 deg. C. A molybdenum cathode is used and the crucible acts as the anode. The molten solution contains between 5 and 15 per cent of the halide, the double fluoride being preferable to the simple salts. The uranium is stripped off the cathode, crushed, washed and dried to yield uranium powder.

Steel Hardening Process

New equipment which uses a mixture of oxygen and town gas for hardening the surfaces of steel crankshafts for diesel locomotives is now coming into use at the Lincoln works of Ruston and Hornsby.

It is claimed that this equipment enables steels containing smaller amounts of nickel and other expensive alloys to be used. The new plant consists of two Peddinghaus flame hardening machines. Heating of the crankshaft is governed by means of an automatic temperature controller.

It is claimed that a mixture of 60 cu. ft. of oxygen to every 100 cu. ft. of town gas provides an ideal fuel. This is not only because of its low cost but also because it permits a design of burner to give a continuous ribbon of flame as opposed to a number of small jets.

Focus on Australia

Two booklets have been prepared by the Australia and New Zealand Bank as guides for concerns contemplating a subsidiary Company in Australia. They are *Australia's Continuing Development* which describes social, industrial and commercial conditions; and *Company Formation in Australia* which outlines company law and current taxation. Copies of both booklets will be gladly supplied on request.

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ANZ

METALS, MINERALS AND ALLOYS

COPPER.—The London cash copper price was momentarily established above the £400 mark this week while the attitude of the American scrap metal dealers, who have recently been refusing 41½ c. for No. 2 wire scrap (equivalent to about 47 c. for virgin metal) suggests that U.S. prices may yet go higher. Meanwhile, custom smelters are reported to be receiving at least 50 c. for refined.

As anticipated, R.S.T. again advanced their fixed price last week-end, this time by a further £55, bringing their price to £500 per ton—now only about £40 below the world price. At the same time, R.S.T. has dropped its recent practice of guaranteeing that each price change would remain in force for a minimum period of 30 days and R.S.T. prices are now subject to revision at any time at 24 hours' notice. One of the principal *raisons d'être* of R.S.T.'s scheme—that of instilling some stability into forward prices—has thus been removed, but with the American producers themselves having apparently given up, at any rate for the present, any attempt at price stabilization, it would in any case have been surprising if R.S.T. had continued the struggle single-handed.

In justice to R.S.T.'s efforts it should be remembered that the group's scheme did represent some attempt at selling forward if only for a month ahead, in contrast to the U.S. copper producers' persistent refusal to depart from their price-on-the-date-of-shipment basis which largely negatived the benefit to independent fabricators of their efforts to peg prices.

Some traders in the States suggested that the easiest way to overcome the chaotic conditions obtaining on the American copper market would be for the producers to revert to their pre-war practice of selling forward at a fixed price over 90 days. To us, an even simpler solution would appear to be for the producers to make a concerted effort to get the futures markets to work. To do this, at any rate on the L.M.E. (and the tin producers have demonstrated that it can be done) it would only be necessary for producers to sell a relatively small proportion of their output on the market so as to stimulate a sufficient volume of trading to produce an indisputably representative price. It can, no doubt, be argued that such an operation is unthinkable at the moment as consumers could not agree to being deprived of tonnages offered to the market. While there might be individual cases of hardship, consumers on balance should not suffer, as whatever copper was sold on the market would still find its way to the consumer so long as the demand was there. As and when this demand eased dealers would take the opportunity of building up stocks as a basis for operating an efficient futures market, which, so far as the L.M.E. is concerned is, of course, its essential function. Incidentally, even without the active co-operation of the Commonwealth producers, and despite the difficult market conditions, it is noteworthy that stocks in official warehouses again rose by some 1,100 tons in August and at the beginning of September stood at 6,846. This does suggest that it might only require co-operation on quite a minor scale from the Commonwealth producers and from consumers to get the futures market soundly established.

In Washington, pressure is being kept up on the Administration to help out further with the copper shortage. The latest move has been a petition to the President from the copper and brass-using industries to release copper already stockpiled The petition asserts that the industry faces the worst crisis in its history and that some 30,000 small manufacturing plants will have to shut down by the end of this month unless near normal delivery of brass and copper mill products can be quickly resumed. This situation is not, of course, entirely due to the copper shortage as the immediate crisis was greatly worsened by the recent Connecticut Valley floods. News on this front is that partial or full production in some of the brass and copper mills in this area is likely to be restored sooner than was originally expected, and some relief has also been secured by manufacturers stepping up production in plants in other areas. As the law stands at present copper withdrawn from the stockpile (as distinct from the diversion of deliveries earmarked for the stockpile) requires the sanction of Congress unless these withdrawals are demonstrably required for national defence.

It has of late been stressed in the American press that talk of a loss of 85,000 tons of copper as a result of the recent wage-negotiation strikes is somewhat misleading, in that this figure relates to mine production. The strikes, of course, affected also smelters and in terms of the immediate copper crisis the fact that 140,000 tons of refinery production was lost as a result of the strikes is a more significant measure of the immediate difficulty. Some of the smelter loss can, of course, be made up fairly quickly whereas the mining side of the industry is already at full pressure. Bearing these figures in mind it is not surprising to find the copper and brass users pointing in their petition specifically to the 100,000 tons of stockpiled Chilean copper as being particularly appropriate for release. It will be recalled that early last year this tonnage was acquired by the stockpile to assist in the liquidation of Chile's accumulated stocks which had been built up during that winter, while Chile had been out of the market, and which at the time appeared to have assumed such menacing proportions.

On the Copperbelt, the African Mineworkers' new wage claim for a daily increase of 6s. 8d. lodged a fortnight or so ago, has now been rejected outright by the Chamber of Mines. The 6s. 8d. wage demand forms part of the Union's overall demand lodged early in the year, for a wage increase of 10s. 8d. a shift The demand was then rejected and the African miners on the Copperbelt staged a two-month strike. The 10s. 8d. claim was submitted again later but was countered by an increase in cost of living allowances and in copper bonuses, the Union agreeing to defer its demand for an increase in the basic pay until August. Last month the Union again raised the issue asking for a 6s. 8d. a shift increase which would have had the effect of bringing the increase to the 10s. 8d. petitioned for at the beginning of the year. The Union has countered this rejection by declaring the existence of a dispute.

LEAD.—The U.S. market appears to have been quiet though firm during the past week and as long as American industrial demand remains at its present level there is unlikely to be any appreciable surplus for the stockpile. U.S. battery shipments for the first seven months of this year are reported at 11,131,000 units, an increase of 64,000 units over the corresponding period of last year.

TIN.—In the table below we give the Tin Study Group's latest reported outputs from the chief producing countries. It will be seen from this that for these countries outputs so far this year are on balance some 2,000 tons up over the corresponding period last year.

Country	*Period*	*1955*	*1954*
Belgian Congo	Jan.-July	8,962	6,137
Bolivia*	Jan.-June	13,268	13,227
Indonesia	Jan.-July	17,665	19,449
Malaya	Jan.-July	35,451	34,575
Thailand	Jan.-June	3,871	3,773
Nigeria	Jan.-June	4,880(e)	4,649

* Exports (e) Estimated

The T.S.G.'s figures of world tin production (excluding U.S.S.R. and China) for the first six months of this year are also up on the corresponding period of 1954 at 80,700 tons as against 76,900 tons. These figures are worth emphasizing as there appears to have been an impression in some quarters that tin production was actually declining. While this may well be an imminent possibility, more particularly in Malaya (where, as Mr. G. W. Simms pointed out the other day in his circular to Geevor shareholders, the encouragement of prospecting is becoming a matter of increasing urgency), the fact remains that for the moment world production is still keeping up.

Consumption during the first six months of this year is reported at 74,000 tons against 68,700 tons in the first six months of 1954. These figures confirm the general impression that tin consumption is rising and suggests an increase on the year of some 10,000 to 12,000 tons. On this basis, the year's surplus production seems likely to be between 20,000 and 25,000 tons which on present showing is likely to be about the tonnage absorbed by the Texas smelter—no doubt by Washington's benevolent design.

However, as if to underline the point that Uncle Sam cannot be relied on indefinitely to equate world supply and demand, it was announced last week in Washington that the O.D.M. had authorized the Federal Facilities Corporation to enter into negotiations for the disposal of the Texas smelter. It is hoped to sell the smelter to private interests who would continue to operate it. Let us hope that this news has been duly noted at Djakarta where the Indonesian Government has still to ratify the I.T.A., a matter which must now in any case be shelved until after the elections at the end of this month. As we have pointed out before, there is nothing inherently impossible in a privately owned Texas smelter sell-

ing to the stockpile but it is improbable that the Adminstration would now be making serious attempts to sell the smelter unless it was intending to terminate its stockpiling.

Whether or not the F.F.C. will be successful in finding a buyer for the smelter is, of course, another matter, for it is notorious that the Texas smelter is an inefficient operating unit. Presumably the crux of the matter is the price at which Washington is prepared to let it go. In its announcement last week O.D.M. stated that the smelter's initial construction costs plus subsequent additions and improvements represented an expenditure of about $13,200,000, but F.F.C. officials subsequently stated that they could not reveal what value the government now placed on the smelter because of differing views on the controversial question of depreciation. If Washington is prepared to write down the capital value of the plant sufficiently drastically, its purchase might become an attractive proposition and no doubt Billiton, the present managers of the smelter who technically must be in the best position to know its possibilities, would be possible bidders. If they turn the opportunity down, it is difficult to imagine any other competent private interest having the temerity to take a chance.

In the brief text of the O.D.M. announcement which has so far reached us, nothing is said regarding conditions on which the smelter will be sold, but it is at least likely that the Administration might require some assurances both as to the minimum tonnages to be put through the smelter and where they were to be purchased.

ZINC.—The probability of a rise in the U.S. zinc price became a reality last Tuesday with a ½ c. advance to 13 c. per lb. for prime western, East St. Louis. This makes the U.S. price equivalent to £104 per ton against the current L.M.E. price of around £92. Even so, with the import duty to pay the differential is still not enough to attract metal across the Atlantic. We referred here last week to the healthy state of American zinc consumption and the next monthly offerings to the stockpile are unlikely to be any bigger in consequence of this week's price rise.

It was reported last week that U.S. shipments of galvanized sheets for the first seven months of this year were about 18 per cent up on the corresponding period of 1954 at 1,576,272 s.tons.

WOLFRAM.—Shortage of supplies rather than the influence of unusually heavy demand is thought to be the explanation behind the continuing rise in the price of wolfram which on Thursday stood at 266s.-269s. per l.ton unit c.i.f. Europe.

PLATINUM.—On Wednesday of this week the U.S. price of platinum was raised to $91-$94 per f.oz. depending upon quantity. The increase had been expected as continental prices have been steadily drawing away from the previous New York quotation of $80 per oz. In fact the much higher European price resulted in limiting offers of the metal to the U.S. with the result that consumers there could not fully cover requirements. Baker and Co. initiated the advance, but, so far the other primary seller of the metal, Johnson Mathey and Co., is not offering platinum and the company has not reached a decision as to whether they will fall in line with the higher level. A company spokesman pointed out, however, that it might be forced to follow the price advance as platinum in Europe was currently changing hands at around $92-$92½ per f.oz. If, on the other hand, this spokesman added, the company decides to retain the former price of $80 per oz. it would restrict its offerings to those customers who have regularly purchased platinum during the last year and a half.

SILVER.—The central feature of the London bullion market this week has been the rise in the price of cash and forward silver by ¼d. to 79½d. and 79¼d. per oz. respectively. Demand on a market fairly short of the metal is the direct explanation for the silver quotation now being at its highest point since the spring of 1920. Yet the actual volume of business was small and the rise was partially due to an adjustment of the price to maintain parity with the New York level. Nevertheless, the new level is still being held.

The London Metal Market

(From Our Metal Exchange Correspondent)

It was announced last week-end that the Rhodesian Selection Trust's price for electrolytic copper would be raised by £35 to £360 per ton c.i.f. U.K. port, effective September 5. This price is subject to revision at twenty-four hours' notice, whereas formerly the quotation was firm for at least thirty days.

The general strike in Chile which was to have started last Monday has been called off, it being stated that agreement with the Government has been reached, but there seems to be some unrest in Northern Rhodesia where the Chamber of Mines is reported to have rejected the wage claim of the African Mineworkers' Union. Substantial business has taken place on the Continent for the first quarter of next year, and in the United States buyers are still paying high prices for electro. In London the market has continued to display a very firm undertone, although the volume of trading has been somewhat less than of late.

There has been no particular feature in the tin market which has been comparatively steady. There has been a fairly good demand by both American and European consumers and sales of cash tin on the London market have been well absorbed. The U.S. Government is calling for bids for the sale of the Texas City tin smelter, but it is unlikely that any decision will be come to for some time. On Thursday morning the Eastern price was equivalent to £758¼ per ton c.i.f. Europe.

The lead market continues very steady with quite a firm undertone. Consumptive demand is quite good and available supplies are well taken care of.

Zinc has been a firm market, and the rise in the American price of ½ c. to 13 c. per lb. on Tuesday added to the firmness of the London market. The rise in the American price was not unexpected, and is attributed to the good domestic demand, the improved statistical position, and rising costs of production as a result of wage increases.

Closing prices and turnovers are given in the following table:

	September 1		September 8	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£393	£394	£393½	£394
Three months	£387	£387½	£388	£388½
Settlement	£394		£394	
Week's turnover	4,750 tons		3,400 tons	
Tin				
Cash	£747½	£748	£744	£744½
Three months	£747	£748	£744½	£745
Settlement	£748		£744½	
Week's turnover	660 tons		805 tons	
Lead				
Current half month	£107	£107½	£107	£107½
Three months	£106½	£107	£107	£107¼
Week's turnover	2,475 tons		1,600 tons	
Zinc				
Current half month	£90½	£90½	£92½	£92½
Three months	£89½	£90	£91½	£91½
Week's turnover	4,525 tons		5,450 tons	

OTHER LONDON PRICES — SEPTEMBER 8

METALS

Aluminium, 99.5%, £171 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 6d.
Chromium, 6s. 11d./7s. 4d. lb.
Cobalt, 21s. lb.
Gold, 251s. 4¼d.
Iridium, £30 oz. nom.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, £40 oz. nom.
Palladium, £7 0s./£7 10s. oz.
Platinum U.K. and Empire Refined £29 oz. Imported £32 10s. oz.
Rhodium, £40
Ruthenium, £17 oz.
Quicksilver, £90/£95 ex-warehouse
Selenium, 72s. nom. per lb.
Silver, 79½d. f.oz. spot and 79¼d. f'd
Tellurium, 16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 30% 5s. c.i.f. 65% 8s. 6d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (semi-friable) 48% £13 per ton c.i.f.
,, Refractory 45% .. £13 per ton c.i.f.
,, Smalls 42% .. £10 2s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. £10-£11 d/d
Molybdenite (85% basis) .. 105s. 0d.-108s. 0d. per unit c.i.f.
Wolfram and Scheelite (65%) .. 266s./269s. c.i.f.
Tungsten Metal Powder (98% Min. W.) .. 20s. 10d. nom. per lb. (home)
Ferro-tungsten (80%-85%) .. 17s. 10d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £39 3s. 9d. d/d per ton
Ferro-manganese, home .. £54 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) basis 100s. freight. .. .. .. 83d./84d. per unit c.i.f.
Manganese Ore (38%-40%) .. 68d./69d. per unit
Brass Wire .. .. 3s. 7d. per lb. basis
Brass Tubes, solid drawn .. 3s. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The sharp fall in the Gilt-Edged stocks which has been going on for some time past continued during the first part of this week. On Tuesday, however, a steadier tone was noticeable and on Wednesday there was a sharp reversal and a revival in prices occurred. The efforts made by the Council of the T.U.C. to bring some measure of control to unofficial strikes also caused a renewal of confidence.

There was more interest in the Kaffir shares and quiet buying of leading finance houses. The removal of some of the restrictions on exporting bearer shares caused a rise in Anglo American Corporation which went further ahead to 9½ yesterday on the maiden O.F.S. dividends.

The monthly returns for August were well received in Johannesburg and selective demand occurred for some of the individual Rand mines. There was renewed interest in one or two of the older properties and Venterspost particularly went ahead on favourable press comment which drew attention to the margin between earnings and distributions. Elsewhere, price movements were erratic but the market tone improved in late dealings on Wednesday.

At Freddies meeting it was announced that the company has a 20 per cent interest in the new area being explored in the Far West Rand. Some details were given and encouraging reef values are understood to have been encountered between 3,000 and 6,000 ft. Some of the excellent monthly figures produced by the leading Orange Free State properties attracted attention. Harmony, President Steyn and St. Helena all did well although share prices remained unaffected until Wednesday. President Brand excelled itself and the large profits made despite limited tonnage put through further strengthened rumours that the company would declare a maiden dividend shortly. Actual distributions by President Brand, Western Holdings and President Steyn of 1s., 1s. 6d. and 6d. per 5s. share respectively were announced after hours on Wednesday. Brand rose 1s. to 74s. 10½d. and Western Holdings ½ to 4 7/16 yesterday on the news, although Steyn eased slightly.

In the West African market, Ashanti Goldfields produced good August figures and this, coupled with the fact that Eaton Turner shaft is now believed to be down to its final depth, brought about a sharp rally in the shares.

Among Diamonds, Casts strengthened further and there was renewed interest in De Beers Deferred bearer shares. Here again the new Treasury regulations assisted the upward movement.

The price of copper rose to over £400 a ton during the week. Despite buying from the United States, share prices remained little changed until Wednesday when a sharp all round improvement occurred. A pay claim by native miners was rejected by the local Chamber of Mines. The maintained interim dividend by Chartered disappointed the market and the shares recorded little improvement. Rhodesian Selection Trust recently raised their fixed price of copper to £360 a ton and the period for notice of alteration was changed from 30 days to 24 hours. This brought about a big improvement in the price of R.S.T.

Even tin shares were under a cloud due to local political developments in Malaya. Buyers were selective, preferring those companies with adequate proved reserves. Ayer Hitam new shares were at one time down to 4½d. premium before hardening later in the week. Sungei Kinta were affected by the good August returns and jumped 1s. 3d.

In the Nigerian section, the 1 per cent increase in distribution by Amalgamated Tin left the share price unchanged owing to the uncertain outlook for columbite. Buyers came in for Beralt at lower levels due to the outlook for Wolfram and the company's strong cash position.

Lead/zinc shares had already discounted the increased price in zinc in the United States and share changes were mainly erratic.

Among miscellaneous base metal issues there were few items of interest but a sharp advance in Associated Manganese took place following more optimistic reports concerning railings of ore from the South African property.

Finance	Price Sept. 7	+ or — on week
African & European	3½	.....
Anglo American Corpn.	9¼	+¼
Anglo-French	22/-	.....
Anglo Transvaal Consol.	25/7½	.....
Central Mining (£1 shrs.)	48/-	+6d
Consolidated Goldfields	62/-	—1/-
Consol. Mines Selection	43/1½	+1/3
East Rand Consols	2/-	.....
General Mining	4 1/16	.....
H.E. Prop.	8/3	—4½d
Johnnies	44/3	—1/3
Rand Mines	3¼	+⅛
Rand Selection	45/7½	—7½d
Union Corporation	49/3	—3d
Vereeniging Estates	4¼	—⅛
Writs	41/10½	—1/3
West Wits	40/-	.....
Rand Gold		
Blyvoors	29/-	+1/-
Brakpan	7/6	.....
Buffelsfontein	38/3	—6d
City Deep	12/6	—3d
Consol. Main Reef	23/1½	+7½d
Crown	2 1/16	—⅛
Daggas	2 1/16	+¼
Dominion Reefs	35/3	—6d
Doornfontein	26/-	—1/3
Durban Deep	35/-	.....
E. Champs	6/-	.....
E. Daggas	10/6	+6d
E. Geduld (4s. units)	31/9	+3d
E. Rand Props.	3 3/16	+⅛
Geduld	4 1/16	+⅛
Govt. Areas	8/-	+6d
Grootvlei	24/-	+1/-
Hartebeestfontein	37/9	.....
Libanon	8/4½	.....
Luipaards Vlei	20/3	—3d
Marievale	23/-	+1/-
New Kleinfontein	7/3	.....
New Pioneer	12/9	—3d
Randfontein	58/9	—1/3
Robinson Deep	18/1½	+4½d
Rose Deep	10/-	—3d
Simmer & Jack	4/4½	—1½d
S.A. Lands	23/1½	+7½d
Springs	3/3	—1½d
Stilfontein	28/-	+3d
Sub Nigel	35/7½	—7½d
Vaal Reefs	31/9	—6d
Van Dyk	3/6	.....
Venterspost	15/-	+4½d
Vlakfontein	18/-	—3d
Vogelstruisbult	32/-	+9d
West Driefontein	5 1/16	—⅛

Rand Gold contd.	Price Sept. 7	+ or — on week
W. Rand Consolidated	43/9	—7½d
Western Reefs	40/-	+7½d
O.F.S. Gold		
Freddies	7/10½	—10½d
Freddies Consolidated	5/-	+1½d
F.S. Geduld	4 1/16	.....
Geoffries	15/9	+3d
Harmony	32/3	—6d
Loraine	6/-	—4½d
Lydenburg Estates	18/1½	+1½d
Merriespruit	9/6	—4½d
Middle Wits	14/9	+1½d
Ofsits	68/3	—3d
President Brand	73/9	+1/3
President Steyn	38/6	—9d
St. Helena	30/6	.....
Virginia Ord.	12/7½	+1½d
Welkom	19/9	—6d
Western Holdings	4 1/16	—⅛
West African Gold		
Amalgamated Banket	2/1½	.....
Ariston	6/4½	+1½d
Ashanti	22/4½	+10½d
Bibiani	4/6	+1½d
Bremang	1/4½	.....
G.C. Main Reef	2/10½	+1½d
Konongo	2/10½	+1½d
Lyndhurst Deep	1/3	.....
Marlu	7½dxc	.....
Taquah	2/-	.....
Western Selection	9/-	+3d
Australian Gold		
Gold Mines of Kalgoorlie	13/6	.....
Great Boulder Prop.	10/9	.....
Lake View & Star	19/6	.....
Mount Morgan	23/1½xd	+4½d
North Kalgurli	7/1½	+4½d
Sons of Gwalia	4/3	.....
Western Mining	8/7½	.....
Miscellaneous Gold		
Cam & Motor	8/10½	.....
Champion Reef	4/6	.....
Falcon Mines	6/9	—1½d
Globe & Phoenix	25/6	.....
G.F. Rhodesian	6/4½	—3d
Motapa	1/4½	.....
Mysore	3/3	—1½d
Nundydroog	7/3	.....
Ooregum	4/1½	—1½d
St. John d'El Rey	15/-	.....
Zams	61/-	—10½d

Diamonds and Platinum	Price Sept. 7	+ or — on week
Anglo American Inv.	9 1/16	—⅛
Casts	29/3	+1/6
Cons. Diam. of S.W.A.	7	.....
De Beers Defd. Bearer	6 3/16	+⅛
De Beers Pfd. Bearer	15½	—½
Pots Platinum	9/7½	+1½d
Waterval	16/9	.....
Copper		
Bancroft	44/9	—3d
Chartered	73/-	—1/-
Esperanza	3/9	—1½d
Messina	9 1/16	+⅛
Nchanga	16½	+½
Rhod. Anglo-American	6 1/16	—⅛
Rhod. Katanga	22/3	—6d
Rhodesian Selection	55/3	+5/3
Rhokana	46½	—2
Rio Tinto	3¼	—1/16
Roan Antelope	29/6	.....
Selection Trust	4 1/16	—⅛
Tanks	9 1/16	+⅛
Tharsis Sulphur Br.	7	+½
Tin (Eastern)		
Ayer Hitam	22/6xc	—9d
Gopeng	9/3	.....
Hongkong	7/6	.....
Ipoh	22/6	.....
Kamunting	9/6	—3d
Kepong Dredging	3/6	.....
Kinta Tin Mines	15/7½	—4½d
Malayan Dredging	9/7½	+1½d
Pahang	12/6	—6d
Pengkalen	11/9	—3d
Petaling	10/6	+3d
Rambutan	19/-	.....
Siamese Tin	7/10½	—1½d
Southern Kinta	19/6	—3d
S. Malayan	8/6	—1½d
S. Tronoh	8/9	—10½d
Sungei Kinta	15/9	+1/3
Tekka Taiping	7/3	—6d
Tronoh	8/7½xd	—4½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	13/-	.....
Beralt Tin	37/4½	—10½d
Bisichi	5/9	.....
British Tin Inv.	23/3	—6d
Ex-Lands Nigeria	2/6	+1½d
Geevor Tin	14/4½	.....

Tin (Nigerian and Miscellaneous) contd.	Price Sept. 7	+ or — on week
Gold & Base Metal	1/10½	.....
Jantar Nigeria	6/7½	—3d
Jos Tin Area	14/9	.....
Kaduna Prospectors	2/1½	.....
Kaduna Syndicate	3/-	.....
London Tin	9/9	—1½d
United Tin	2/-	.....
Silver, Lead, Zinc		
Broken Hill South	56/3	—6d
Burma Mines	2/6	—1½d
Consol. Zinc	52/6	—1/3
Lake George	12/9	+3d
Mount Isa	63/3	+9d
New Broken Hill	40/3	—3d
North Broken Hill	77/-	+1½d
Rhodesian Broken Hill	13/4½	—3d
San Francisco Mines	22/6	—3d
Uruwira	6/6	—1½d
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	50/7½	.....
Associated Manganese	39/9	+1/9
Cape Asbestos	9/9	—1½d
C.P. Manganese	32/6	—1/3
Consol. Murchison	58/9	—1/3
Natal Navigation	2 1/16	.....
Turner & Newall	104/-	—6d
Wankie	17/4½	—1½d
Witbank Colliery	4	.....
Canadian Mines		
Dome	$28	.....
Hollinger	$42½	+¼
Hudson Bay Mining	$128	+2½
International Nickel	$155¼	+1
MiningCorpn.ofCanada	£9 1/16	—⅛
Noranda	$111½	.....
Quemont	£10	—¼
Yukon	4/4½	+1½d
Oil		
British Petroleum	5 1/16	+¼
Apex	34/6	.....
Attock	39/6	—6d
Burmah	3¼	+1/16
Canadian Eagle	64/6	+3/-
Mexican Eagle	23/9	+1/6
Shell	7¼	+1/16
Trinidad Leasehold	38/6	+1/-
T.P.D.	24/-	—3d
Ultramar	28/6	+3d

COMPANY NEWS AND VIEWS

Maiden O.F.S. Dividends

With the declaration of maiden dividends from three of the Anglo American group O.F.S. mines, another milestone in the progression of the new field from its post-war state of initial examination to a gold-producing area has been passed.

The new entries into the ranks of South African gold producing dividend payers has created a "little Rand dividend season" at September 30, additional to December 31, as has previously been the date for Rand gold mining companies. So far the constituents of this list are Western Holdings, with a maiden dividend of 1s. 6d.; President Brand, with a payment of 1s., and President Steyn with 6d., on the 5s. shares of each company.

In accordance with the flotation agreements of President Brand and President Steyn, amounts of £650,000 and £325,000 respectively become payable to Welkom Gold Mining Company in respect of loans outstanding, amounting to £1,250,000 for each company. The agreements, it may be recalled, provided for loan repayments equal to the amounts allotted by each company for distributions.

On receipt of the total amount of £975,000 by Welkom Gold Mining Company, on or before December 31, 1955, an equivalent amount of its 5 per cent debentures will be redeemed in terms of the original issue.

Rand and O.F.S. August Returns Notable for Higher Profits and Lower Costs

Working profits from Rand and O.F.S. producing mines in respect of the month of August, based on a gold price of 250s. 8d. as compared with 251s. 3d. during July, were on the whole higher than those of the preceding month. In many cases this was due to higher tonnages milled—reflecting the better supply of native labour—which was responsible for a fall in costs. From the O.F.S. and Far Western Rand one or two good increases in milling grade were reported. Foremost amongst these was President Brand which, with the addition of 0.25 dwts. per ton over the previous month's figure, reached the exceptional level of 16 dwts. per ton. At Hartebeestfontein a sharp rise to 7.8 dwts. per ton from 6.7 dwts. during July took place.

. . . *Kaffir Market Revival*

Marketwise the August monthly reports were well received. This was due not only to the merit of the returns themselves but to a better feeling which has recently become apparent towards gold investment. Indeed, there are many who feel that current inflationary trends in the U.K. brought about by unrestrained wage claims, will take some time to reverse. At all events, in the face of present difficulties, no immediate recovery in the prolonged industrial share market boom can be expected. Forced selling to meet calling in of bank advances has driven small investors and speculators alike out of the market, and until a more definite trend is established, the return of larger institutions as buyers should not be anticipated. During the next three or four months the monthly balance of payments position will be carefully scanned for the essential improvement which is necessary to restore confidence.

Meanwhile, the stage appears set for a renewal of interest in gold shares. How long this may last will, in the first instance, depend largely upon the time taken to arrest U.K. gold and dollar losses. But apart from this consideration, events which may occur in the immediate future could—in their own right—draw considerable attention to the Kaffir market.

Amongst these, future development results from Free State Geduld will undoubtedly play an important part, while of more immediate importance is the declaration of dividend payments in respect of the year ended September 30, 1955, from some Anglo American O.F.S. mines. The simultaneous publication of re-estimated ore reserves as at this date is also eagerly anticipated.

. . . *President Brand an Attractive Investment*

When the present market flurry caused by the declarations of maiden O.F.S. dividends has died down, investors will undoubtedly become more intimately concerned with the time factor which must elapse before this mine reaches its capacity milling rate. An expansion programme has recently been embarked upon under which a crushing target of 100,000 tons a month is set for 1958. How soon this second phase of operations will be reached (a further phase is set for 125,000 tons monthly at some date in the future) will, of course, depend upon the progress made with the sub-vertical shaft in the property's southern portion. A further consideration will be the time taken to sink the new shaft at the south-western corner of Welkom's mining lease area, by which President Brand will receive the essential underground ventilation it needs for large-scale underground mining operations.

As it must inevitably take some months before Brand's milling rate fully effects the benefits of this programme, the short-term outlook can envisage only small increases in mill throughput. This is not to say that profits will remain static even at their present high level. On the contrary, as work at the mine goes forward—and this on past showing should not

RAND AND O.F.S. RETURNS FOR AUGUST

Company	August 1955 Tons (000)	Yield (oz.)	Profit† (£000)	Year ends	Current Financial Year, Total to date Tons (000)	Yield (oz.)	Profit† (£000)	Last Financial Year, Total to date Tons (000)	Yield (oz.)	Profit† (£000)
Gold Fields										
Doornfont'n	50	20,239	85·0	J	101	40,288	170·2	100	33,001	161·4
Libanon	96	20,886	58·9	J	196	42,121	118·3	192	40,150	100·7
Luipaards V.	124	18,705	46·9	J	251	37,478	a119·3	219	43,258	88·8
Rietfontein	27	6,056	20·7	D	211	47,612	167·4	222	49,738	190·5
Robinson	84	17,749	17·0	D	660	141,526	166·0	790	185,324	197·1
Simmer	122	20,078	17·1	D	956	159,682	138·3	1,007	162,294	91·2
Sub Nigel	66	21,117	82·4	J	133	42,354	167·9	134	44,389	206·9
Venterspost	125	28,956	78·6	J	250	58,012	157·6	214	52,388	121·8
Vlakfontein	39	14,270	72·1	D	309	109,487	584·4	308	110,019	568·3
Vogels	103	26,564	b142·5	D	823	212,234	1014·2	819	207,403	869·8
West Drie	71	54,756	463·3	J	142	109,154	872·4	103	77,608	605·0
Anglo American										
Brakpan	109	18,524	17·2	D	855	145,833	122·2	885	149,102	106·5
Daggas	229	52,371	318·9	D	1,814	414,102	2542·9	1,771	411,305	2526·2
East Daggas	96	16,001	44·5	D	769	128,173	473·5	746	126,682	369·4
P. Brand	48	38,402	322·3	S	338	255,535	2025·6	30	12,292	54·0
P. Steyn	80	28,402	150·9	S	371	191,564	898·9	206	56,692	103·3
S. A. Lands	93	17,970	57·1	D	756	143,034	448·6	801	147,485	431·7
Springs	122	15,428	11·0	D	955	125,474	68·1	1,035	144,869	60·5
Welkom	79	16,000	13·5	S	635	125,367	76·9	568	112,940	32·9
W. Holdings	70	25,719	152·4	S	522	193,481	995·1	375	128,911	473·7
W. Reefs Ex.	120	23,044	58·3	D	943	176,948	440·5	922	181,567	519·8
Central Mining										
Blyvoor	114	64,310	495·1	J	226	126,890	971·4	220	125,345	974·5
City Deep	169	31,729	L6·1	D	1,283	244,658	L6·4	1,314	250,333	131·0
Cons. M.R.	179	25,057	22·4	J	359	50,029	48·0	352	48,253	39·4
Crown	315	49,204	52·1	D	2,407	1,195,238	400·8	2,283	360,898	394·4
D. R'poort	192	32,141	55·7	D	1,442	243,128	401·6	1,417	234,564	363·0
E. Rand Pr'p	221	54,742	179·9	D	1,708	410,285	1285·2	1,617	365,994	975·2
Harmony	71	25,920	132·5	J	134	47,609	242·9	—	—	—
Modder B.	57	5,660	1·1	D	456	45,641	8·3	453	47,309	20·6
Modder East	137	13,889	9·0	J	268	27,558	17·1	238	27,192	23·7
Rose Deep	58	8,887	5·8	D	477	74,241	58·2	567	86,086	95·7
Welgedacht	34	3,906	0·5	J	68	7,682	1·0	69	8,571	7·5
J.C.I.*										
E. Champ	20	1,725	d6·3	D	159	12,663	‡48·9	184	17,958	52·4
Freddies C.†	85	13,519	L49·8	D	659	116,588	L285·3	613	104,312	L153·5
Govt. G.M.	267	31,297	e16·0	D	2,042	257,918	211·3	2,082	271,141	245·5
Randfontein	257	29,132	f100·4	D	2,078	232,246	‡744·8	2,311	302,763	203·0
Union										
East Geduld	155	47,661	361·2	D	1,194	367,168	2769·4	1,084	333,319	2431·0
Geduld Prop	107	17,125	47·3	D	717	132,061	361·1	738	120,239	217·5
Grootvlei	205	44,380	266·4	D	1,550	335,307	1947·8	1,439	306,660	1710·0
Marievale	74	19,238	93·5	D	581	147,817	710·0	521	132,687	582·7
St. Helena	108	29,700	155·1	D	833	206,293	1032·4	653	144,654	421·1
Van Dyk	83	13,367	2·6	D	642	106,153	15·7	629	108,510	14·1
General Mining										
Ellaton Gld.	32	8,643	h38·3	D	245	71,835	350·6	211	61,646	289·5
S. Roodep't	29	6,385	23·2	J	56	12,474	44·7	56	12,061	41·3
Stilfontein	86	33,776	h210·0	D	671	263,634	1655·1	656	222,733	1287·8
W. Rand C.	240	27,126	g225·6	D	1,904	221,699	1793·0	1,811	227,304	1483·1
Anglo-Transvaal										
Harteb'stf'n	46	17,979	72·5	J	90	32,729	130·2	—	—	—
N. Klerks	11	i1,322	L2·0	D	90	11,217	L6·0	90	6,686	L11·3
Rand Leases	191	30,178	37·2	J	382	60,452	77·5	370	62,160	8·30
Village M.R.	35	5,058	9·7	J	69	10,147	19·4	70	10,492	22·3
Virginia	65	j13,974	43·9	J	130	27,949	86·8	—	—	—
Others										
Nigel Gold	31	3,309	L3·7	D	211	28,693	L15·2	224	34,564	7·3
N. Klein	110	12,909	5·1	D	862	101,249	45·2	862	107,282	118·8
Spaarwater	11	2,898	1·2	D	96	21,945	9·6	85	21,413	1·8
W. Nigel	18	3,963	8·0	J	37	7,938	16·4	35	7,800	18·8

L indicates loss.
* working profit includes sundry revenue.
† Excludes gold sales at premium prices.
‡ Gold and uranium.
a Including Bird Reef, milled 35,000 tons, recovered 1,472 oz., profit £21,300.
b Including £43,000 uranium profit. Before loan instalment repayments.
d After crediting £40,000 estimated uranium revenue.
e After crediting £8,031 estimated revenue from pyrite.
f After crediting £335,000 estimated net revenue from uranium and acid.
g After crediting £267,000 estimated profit from uranium.
h Excluding uranium profit which is declared quarterly.
i After crediting £4,500 from uranium, before deductions of £625.
j Operations after crediting £22,014 from acid, before deductions of £16,318.
Note: O.F.S. mines of the Anglo-American group in future to end financial years on September 30, indicated above by "S".

prove to be slow—efficiency will improve both underground and on the surface. A progressive decline in costs from their present high level should therefore eventuate. Moreover, during past months the mill grade has shown constant advances. In view of present ore reserves, valued at over 21 dwts. per ton, the scope for increases in this sphere is obvious.

When the mine is milling 1,500,000 tons yearly, even if the mill grade by then is no more than, say, 18 dwts. a ton, working profit on a conservative estimate could reach some £5,000,000 a year. The opportunities held out by a purchase of the ordinary 5s. shares at their present price of around 74s. 6d., are, therefore, extremely attractive.

. . . St. Helena—An 8 dwt. Proposition ?

Another interesting investment possibility is offered by St. Helena shares at their present price of around 31s. 6d. The fact that development results of Union Corporation group mines are discounted to conform with adjustments necessary in estimating ore reserves has the greatest bearing upon the future outlook for this mine. In recent months development at this mine has been giving values of over 400 dwts. per ton. Assuming a stoping width of 50 in., a milling grade in the region of 8 dwts. per ton would thus appear to be ultimately possible. For this reason particular interest will attach to the re-estimate of ore reserves due to be published by this company as at December 31. Meanwhile the mill grade is running in the region of 5 dwts. per ton—as compared with 5.9 dwts. which was the value of reserves last December.

Recently St. Helena announced that a new shaft, Number 2, was to be sunk to serve the north-eastern part of the property. In view of satisfactory development results, it was also decided to increase the immediate plant capacity to over 125,000 tons from its previous level of about 100,000 tons. This first phase should be completed by the end of the current year. More important, however, was the statement that after No. 2 shaft was completed, plant capacity would be stepped up to 150,000 tons monthly. All this work is to be financed from profits.

With a potential milling rate of 1,500,000 tons yearly, St. Helena as an 8 dwt. proposition holds out a promising future, and although it is as yet too early to make accurate estimates of what profits and dividends might be, at their present price of around 32s., "Saints" 10s. shares could soon prove to be very much undervalued.

Rand and O.F.S. Mines Show Better Half-Yearly Reports

A progressive analysis of working results from South African gold and uranium-gold mines published by the Transvaal and O.F.S. Chamber of Mines in respect of the first six months of 1955 to June 30 shows a substantial rise in working profits as compared with those of the previous corresponding period.

Particularly interesting amongst the statistics given in the table below (which have been broken down to show Transvaal and O.F.S. companies separately) is the rise in tonnage milled. Directly responsible for this encouraging event has been the improvement in the availability of African labour. During the first half of 1955 the monthly average of Africans employed ran at about 325,000 as compared with 305,000 during the first six months of 1954.

When studying profit figures of Transvaal companies, although due regard must of course be given to the increased volume of gold produced, it should also be borne in mind that during the period under review a more favourable price was received for gold than that during the first half of 1954.

Overall costs in respect of Transvaal mines worked out at 39s. 5d. per ton milled as compared with 37s. 5d. In the O.F.S. the figure was 51s. 4d. as against 55s. The overall cost per ton showed a slight rise to 40s. 1d. from 38s. during the first six months of 1954.

South African Gold Producers

Comparison and Analysis of Salient Results for Half Years 1955 and 1954

	Jan.-June	*Transvaal Companies*	*O.F.S. Companies*	*Total*
Tons milled	1955	29,167,000	3,340,000	32,507,000
	1954	28,548,400	1,700,500	30,248,900
Ounces produced	1955	6,140,580*	978,442	7,119,022
	1954	5,932,563†	379,099	6,311,662
Grade per ton: dwt.	1955	4.040	5.859	4.226
	1954	3.981	4.459	4.008
Working Profits: Gold £	1955	17,744,412	3,742,988	21,487,400
	1954	17,420,125	47,167	17,467,292
Working Profits: Uranium £	1955	6,920,582‡	523,789‡	7,444,371‡
	1954	3,320,499‡	———	3,320,499‡
Total Profits from Gold & Uranium £	1955	24,664,994	4,266,777	28,931,771
	1954	20,740,624	47,167	20,787,791

* Includes Miscellaneous Producers, 249,552 oz.
† Includes Miscellaneous Producers, 250,166 oz.
‡ Profits from Uranium are subject to adjustment.

Roan and Mufulira Make Higher Profits During 1954-55

The publication of the June quarterly statements of both Roan Antelope and Mufulira Copper Mines show that operations during the year ended June 30, 1955, have been very much more profitable than those a year ago.

In the case of Roan, total copper sales for the year fell slightly to 82,982 tons from 84,706 tons, but revenue—reflecting the higher price for the metal—advanced to £22,625,000 from £19,480,000. Costs, which rose sharply to £12,765,000 from £11,136,000, did not, however, prevent a rise in surplus to £10,627,000 from £8,914,000. Total profits before taxation moved up to £9,883,000 from £8,036,000.

Mufulira's experience was somewhat different in that copper sales expanded slightly to 86,391 tons from 84,467 tons. Revenue accordingly improved to £23,828,000 from £19,416,000. As in the case of Roan, costs increased to £12,272,000 from £10,154,000, but a sharp rise in surplus took place at £12,071,000 from £9,624,000. Profits expanded to £11,130,000 from £8,414,000.

	1954 Sept. Qtr.	*1954 Dec. Qtr.*	*1955 Mar. Qtr.*	*1955 June Qtr.*
Mufulira	*(l.tons)*	*(l.tons)*	*(l.tons)*	*(l.tons)*
Sales	18,525	24,198	18,646	25,022
	(£000)	*(£000)*	*(£000)*	*(£000)*
Revenue	4,310	6,448	5,843	7,227
Costs	2,749	2,772	2,121	4,630
Difference in value of copper stocks	Cr.640	Dr.110	Dr.478	Cr.463
Surplus	2,201	3,566	3,244	3,060
London Expenses	Nil	Nil	Nil	Nil
Replacements*	277	267	196	201
Profit before taxation†	1,924	3,299	3,048	2,859
Roan Antelope	*(l.tons)*	*(l.tons)*	*(l.tons)*	*(l.tons)*
Sales	16,598	22,524	19,872	23,988
	(£000)	*(£000)*	*(£000)*	*(£000)*
Revenue	3,796	5,879	6,055	6,895
Costs	2,707	3,078	2,253	4,727
Difference in value of copper stocks	Cr.697	Cr.152	Dr.549	Cr.467
Surplus	1,786	2,953	3,253	2,635
London Expenses	Nil	Nil	Nil	Nil
Replacements*	208	199	185	152
Profit before taxation†	1,578	2,754	3,068	2,483

* Subject to revision when year's accounts considered.
† Estimated.

The recent R.S.T. Group copper price-fixing scheme came into operation during May and thus it could only have had a limited impact on the June quarterly figures. The first quarter's figures for the year to June 30, 1956, will, therefore, be closely examined on publication for the extent to which revenue was so affected.

Gold and Base and the Columbite Outlook

Speaking at the meeting of Gold and Base Metal Mines of Nigeria in respect of the year ended December 31, 1954, Major-General W. W. Richards, the chairman, expressed his confidence that there was a beneficially expanding market for columbite. Since the U.S. Government stopped further purchases for the stockpile at bonus prices (at prices exceeding £2,000 per ton), some columbite had changed hands through the London market at around £1,000 to £1,200 a ton.

General Richard's view of this commodity's future reflects a growing interest in columbium metal. For instance, there is a section of opinion which believes that future offtake by the stainless steel industry alone will be at least 2,000 tons a year. In terms of Nigeria's production (which accounts for over 90 per cent of the world's supply), such a demand would represent a majority proportion. Moreover, so far only a limited amount of the metal has become available to industrial producers for examination and experiment. When a more general supply comes to hand, the uses of columbium could easily be found to have a very much wider industrial application than at present connected with the manufacture of jet engines.

In terms of Gold and Base's future such a possibility gives rise to a good deal of promise. During the past financial year 150 s.tons of columbite were produced as compared with 99

s.tons previously. In the current year output is expected to reach 200 s.tons. Looking further ahead to 1956, General Richards stated, that on the assumption of a 200 s.ton production rate in 1955 164 tons of the 1956 production would be sold to the U.S. Government at bonus prices.

On the other hand loans from the U.S. authorities, by which the company's columbite expansion has been mainly financed, have reached an ultimate total of £240,595, which must be repaid in kind (i.e. by shipments of columbite). This, it is estimated, will absorb 132 s.tons. As at September 7 some 42 s.tons had been shipped, having an approximate value of £87,000.

Naturally enough the success of Gold and Base's columbite venture will depend on the future price level at which the metal settles down. Nevertheless, the company's columbite ore reserves at 435 s.tons "proved" and 431 s.tons "probable" having a value of .194 lb. per cu. yd. should place it in a competitive and profitable position. What the future may hold in the way of demand for columbium can, of course, only be a matter for speculation. Meanwhile, a yield of nearly 9½ per cent is obtainable on the company's 2s. 6d. ordinary shares at their price of around 1s. 11d.

Powell Duffryn's Higher Trading Profits

A marked rise in trading profits took place during the past financial year ended March 31, 1955, completed by Powell Duffryn. In addition, following the experience of recent years, the profit and loss account benefited from income items of a non-recurring nature. Of particular note amongst these was interest of £181,250 received on Vacuum Oil Company 5 per cent loan stock which has since been sold. Another receipt under this heading was in the form of interim income under the Coal Industry Nationalization Act totalling £37,742. This compared with £385,011 in respect of the preceding twelve months.

Year to Mar. 31	*Total Trading**	*Revenue, Divs. etc.†*	*Taxation*	*Net Profit*	*Dividends*	*Carry Forward*
	£	£	£	£	£	£
1955	1,545,484	637,619	1,192,936	841,811	529,885	1,915,488
1954	1,108,581	830,047	1,032,967	777,395	519,111	2,409,536

* After £457,849 for depreciation (1954—£426,994)
† Including £25,000 transferred from taxation reserve (1954—£80,000)

Referring to the activities of Stephenson Clarke, Sir Herbert Merrett, the chairman, stated that this company's results had been good in both total turnover and earnings. The fleet of thirty coastal colliers had been fully employed during the year and had been required to lift substantial quantities of imported coal from Continental ports. One new ship came into service last year while five more had been ordered and should begin trading over the next year or two.

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GOLD & BASE METAL MINES OF NIGERIA

MAJOR-GENERAL W. W. RICHARDS'S SPEECH

The Twenty-first Annual General Meeting of Gold and Base Metal Mines of Nigeria Limited, was held on September 7, at the Chartered Insurance Institute, London, E.C.2.

Major-General W. W. Richards, C.B., C.B.E., M.C. (Chairman), in the course of his speech, said:—

COLUMBITE DEVELOPMENT PROGRAMME

As you will have seen from our production figures, our output of columbite increased from 93 short tons for 1953 to 150 short tons for 1954, which figure was in fact 10 tons in excess of our estimate. Production during the current year for the seven months ended July 31 amounted to 100 short tons, compared with 68¼ short tons for the same period of the previous year. Our target for 1955 is 200 short tons.

It will be recalled that partly to finance this programme development loans were obtained from the Government of the United States of America. In the Directors' Report, it will be seen that on the Liruei loan, out of an available £250,000, we drew £185,250, while on the Rishi loan, out of an available £100,000, we drew £55,345. These loans, together with interest at 5%, are repayable by June 30, 1956, and December 31, 1956, respectively in shipments of columbite at bonus prices. It is estimated that approximately 132 short tons will be shipped on this account. At this date, some 42 short tons have been shipped, having an approximate value of £87,000. Tonnages so shipped at these bonus prices are, of course, in addition to amounts contracted to be delivered at bonus prices under our Sales Agreement with the U.S. Government. I wish to emphasize that our Sales Contract is in respect of tonnages delivered by December 31, 1956. Assuming production for 1955 is 200 short tons as forecast, then 164 tons of our 1956 production will be sold to the U.S. Government at bonus prices.

TIN

Production showed a decrease compared with 1953 owing to the sale in August 1953 of our Dress Areas. It is satisfactory to note, however, that the current year's operations show an increase in output to date compared with the similar period for 1954. Last year I reported on the International Agreement for the control of world tin production. On the basis as at present agreed, this Company's annual quota for production purposes will be 540 tons of shipping grade concentrate.

LEAD-ZINC

Sufficient work has been accomplished to enable Mines Development Syndicate (West Africa) Limited to apply for a grant of a first Mining Lease covering nearly 7 square miles in terms of the Minerals Development Lead-Zinc Ordinance, 1952.

Members will no doubt have additionally noticed from the Directors' Report that the Government of the Federation of Nigeria have agreed to participate to the extent of £350,000 in the underwriting of an issue of shares, this being the amount which will be reserved for Nigerian applications when such issue is made.

ACCOUNTS

The Accounts now presented show that the Mine Profit before appropriations rose from £103,031 to £187,082, the increase stemming directly from the increased columbite production.

Since the preparation of the Directors' Report, negotiations have been concluded with our principal creditor, Western Selection and Development Company Limited, whereby that Company agreed to accept shares at par in settlement of the amount owing to that Company of £170,000. An allotment of shares has accordingly been made, thus increasing the issued capital to £770,000. This sum represents the balance of purchase consideration arising from the acquisition of the Company's main columbite-producing areas at Liruei.

The Report and Accounts were adopted and payment of the dividend of 7½% was approved.

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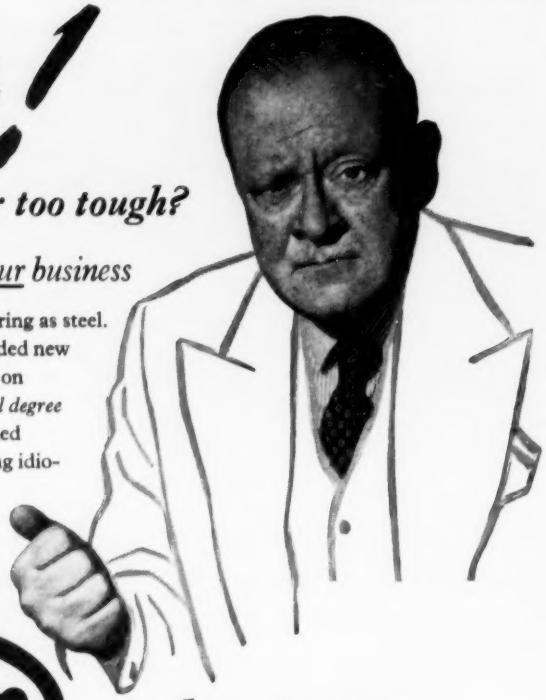

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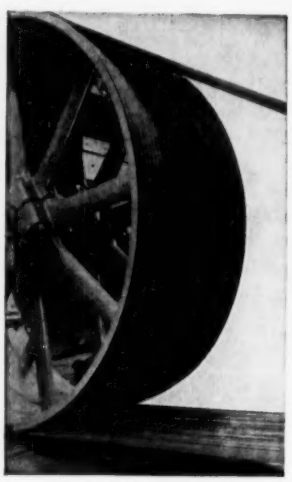

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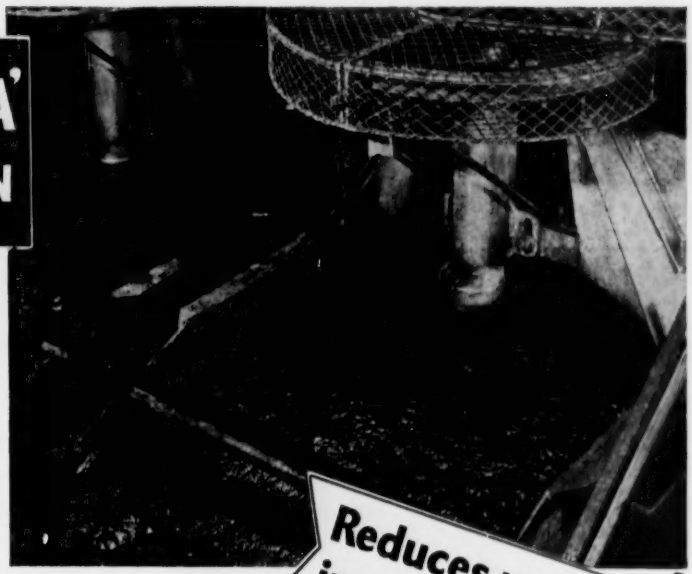

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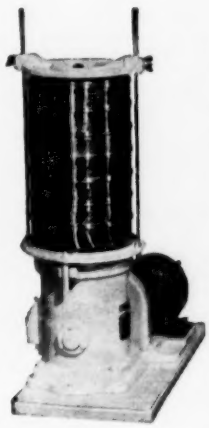

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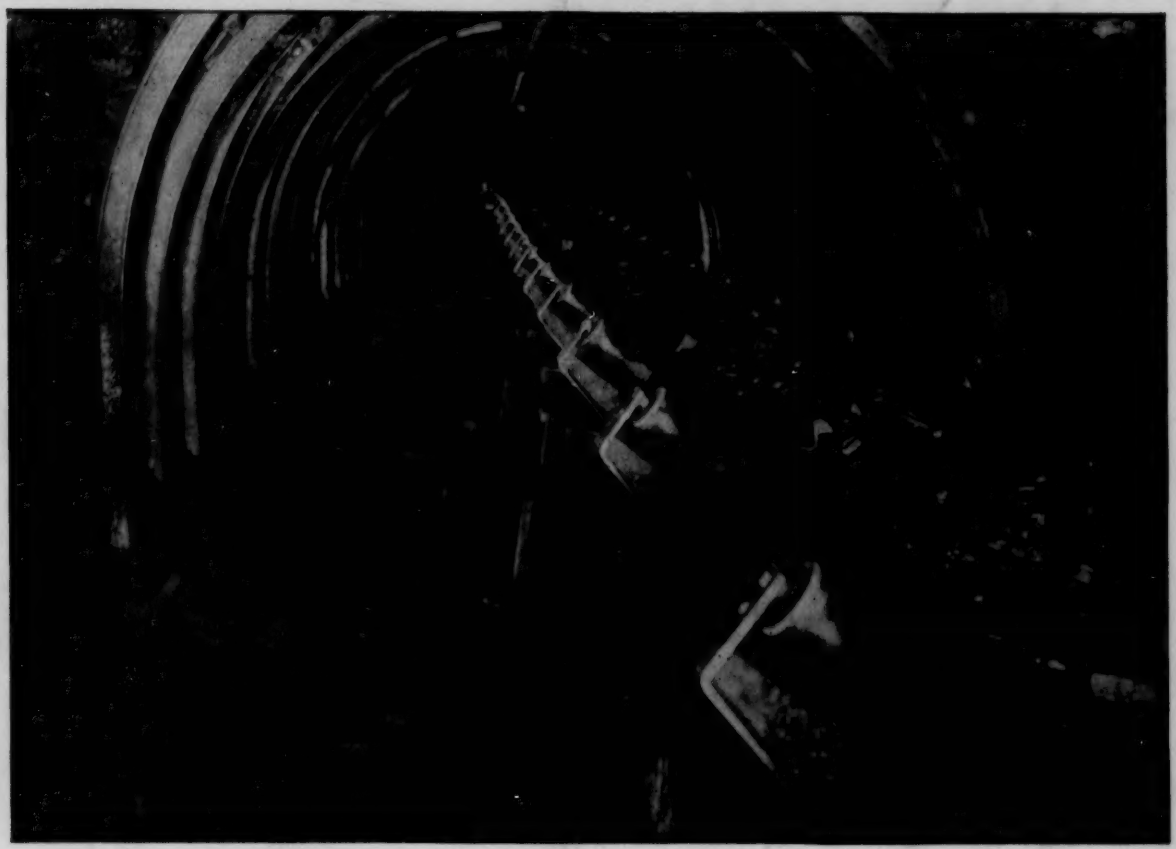

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